THE

AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

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DISINFECTANTS.

Conclusions from facts contained in a memoir upon this subject published in *Archives Générales*, by O. Reveil, Professeur agrégeé à la Faculté de Medecine et á l'école supérieure de Pharmacie, &c., &c.

1st. That there probably exist many kinds of putrid fermentations, varying in their causes as in their effects;

2d. That there is no general disinfectant capable of being indiscriminatly used in all cases;

3d. That liquid disinfectants are always preferable to others, other things being equal, when applied to their therapeutics.

In their application to this purpose regard should be paid to their cost, the facility of their employment and the inconveniences they may cause by corroding, soiling or rendering unserviceable the linen dressings.

4th. The best disinfectant is that which possesses the following properities: it should—A. Instantly destroy or mask bad odors; B. Absorb the liquid or gaseous products of the putrefactive or inflammatory process, remove them by washing, and destroy the poisonous or irritating action of morbid liquids and mephitic gaseous products; C. Hasten then cicatrization of sores, by giving the necessary vitality for the reparation of the tissues.

5th. Chlorine and solutions of bromine and iodine appear to best fulfil the most important of these conditions.

6th. Chlorine, or at least the hypochlorites, by reason of the gaseous state of their active principle, ought always to be preferred when it is desired to destroy miasm and disinfect the air.

7th. The addition of odorous essences, and principally of nitro-benzine to the hypochlorites and to iodine and bromine water, acts both to mask the disagreeable odors and to set into immediate operation the chemical action.

8th. Tar and coal-tar preparations are able to render effectual service, but they do not possess the property, like iodine and bromine, of destroying the poisonous action of morbid products and putrefaction, or that of various kinds of virus.

9th. *Charpie carbonifere*, and especially *charpie carbonifere iodee*, may often be employed with success.

10th. Carbon, in addition to its absorbent properties, appears to exercise *an action of special contact*, in virtue of which it hastens the destruction of organic matters, or rather, as M. Stenhouse states, according to the experience of Turnbull and Turner, by condensing the oxygen of the air, and thus acting as spongy platinum.

11th. Metallic solutions (salts of iron, zinc, &c.), although imperfect disinfectants, suffice in a great number of cases.

12th. Physical and mechanical agents (ventilators, &c.) may be made powerful aids to chemical disinfectants.

13th. There are some causes of *infection* which appear to resist all treatment (ozeana, otitis, &c.)

14th. We should add, moreover, that there are causes of *infection* which it would be dangerous to suppress (*sueur infecte des pieds*), and the odor of which we should endeavor to mask.

One is struck with admiration on reflecting upon the processes which nature employs to disseminate, transform and reproduce organic matters; in the presence of the grandeur of these facts we remain convinced of the exactitude of the aphorism of Lavoisier: "*Dans la nature, rien ne se perd, rien ne se crée.*"—*Boston Med. and Surg. Journ.*

GAS IN ENGLAND.

We learn from the London *Builder* that a Parliamentary return has been issued, showing the actual state and condition of each metropolitan gas company, and the dividend for the year 1862. It appears that the following dividends were paid: The Chartered paid dividends at the rate of 9 and 10 per cent., including back dividends at 1 per cent. per annum for the half year to Christmas, 1856: The City of London Gas Company paid dividends at 9 and 4 per cent with a balance of £658. The Commercial Company paid £30,513 on a capital stock of £322,195 (less sums remaining outstanding.) The capital account is said to "include calls in course of payment," but the rate of dividend is not stated. The Equitable paid dividends at the rate of 11, 14½, 14 and 10 per cent. (less sums remaining outstanding), with a balance of £58,500. The Independent paid at the rate of 10 per cent., with one year's back dividend (£1,500), and a balance of £3,548. The London paid £36,827 on £548,843 (less sums remaining outstanding), but the rate is not stated. Phœnix dividend was 10 per cent., with £8.190 dividend arrears for 1856, with a balance of £930. The Ratcliff dividend was £8 15s. per cent., without a balance. The South Metropolitan paid 10 per cent. with a balance of £10,369. The Surrey Consumers' Company paid 10 per cent., with a balance of £4,047, and the Western 10 per cent, with £3,285 "towards back dividends of less than 10 per cent."

On the whole, we think that the shareholders of the London gas companies have not much reason to complain.

At York, the half-yearly meeting of the shareholders of the gas company was held in August last. The affairs of the company were stated to be in a very prosperous condition, and the usual dividend of ten per cent. was declared. The chairman, in moving the adoption of the report, remarked that the company had managed to get through the great stir that had been made, and that they were not yet annihilated—referring to the threats of an opposition gas company.

The Romsey Gas Company have reduced the price of their gas from 6*s.* 8*d* to 6*s.* per thousand cubic feet. A local paper says: "Our gas in former years, at no very distant period, was 10*s.* per 1,000, and then the finances of the company did not yield much of a dividend; but since the altered management of the last few years things have gradually improved, and now the shareholders have a very fair dividend, ever since all the previous reductions in the price of gas."

At Worcester the gas company have announced a dividend of ten per cent. for the last six months.

The City of London Gas Company have just laid 24-inch pipes to increase the supply from their works at Whitefriars *via*. Ludgate Hill, St. Paul's Churchyard, and Cannon street to the Minories.

At Devonport, the gas company who lately reduced the price of their gas to 4*s.* per thousand cubic feet have just declared a dividend at the rate of 9 per cent per annum on their original shares, and 5 per cent. on others.

At Penzance the gas company have reduced their price from 6*s.* to 5*s.* 6*d.*, with a hope "that an increased consumption will enable the shareholders to make a further reduction."

At Taunton the gas company have reduced their price from 5*s.* 6*d.* to 4*s.* 6*d.*

Reductions in price seem to be the order of the day in England, except in the large cities, where they take place less frequently.

RAILROAD TIES PRESERVED BY COAL-TAR.

On the Reading, Pa., railway, sleepers are being now prepared as follows: The wood is stripped of the bark, and then notched by machinery, to receive the rails with a fair, smooth bearing. The sleepers are then placed in drying kilns, and kept for 48 hours at as high a heat as they will bear without ignition, the smoke and gases of the heating fires being passed directly through the kilns and among the timber. They are then taken out, and while hot their ends are dipped into hot coal-tar, after which they are piled away to dry in the sun until wanted for use.

The coal-tar is used just as it comes from the gas-works. A portion of oil of tar was formerly added, which, being found to take the skin off the hands and faces of the workmen, was abandoned

The kilns are heated, and the boiler, for the engine which drives the notching machinery, is fed with the bark and chips which come off in the work. Each sleeper absorbs about one-third of a gallon of tar by immersion of the ends only, and the whole cost is from 5 to 6 cents a sleeper, depending on the weather and the regularity of the operation.

After heating for 48 hours there is still some sap left in the sleepers, hence they are dipped only at their ends, as it would not do to seal up this sap in the tubes.

The engineer of the road, J. Dutton Steele, Esq., says:

"I do not pretend that this is the very best mode of preserving sills from decay, but I claim that they are more benefitted by this process than any other I know of for the same cost.

"We bark them, dry them, and smoke them, all of which is good; we then dip their ends in coal-tar, which is also good; and we notch them by machinery, which is of great importance, as the rails have thus a fair bearing provided for them, and one which secures the flat tread of the wheel on their heads, which prolongs their wear. We use no other than hard wood, such as the oaks, as I find soft woods wear out too fast. The wear of the rail into an oak sill is about one-eighth of an inch each year under a heavy trade. So there are other destroying influences besides decay to which sills are subject, and it will be observed that our process hardens them, and in that way does good."—*Scientific American.*

PREMIUMS OFFERED.—The Council of the Institution of Civil Engineers, of England, offer premiums for essays upon a variety of subjects, among which are the following, coming within the specialities of this JOURNAL. The subjects are numbered as below.

6. Artesian well boring, and sinking large shafts, as on the Continent.

17. Observations on the flow of water from the ground, in any large district; with rain-gauge registries.

18. The construction of catch-water reservoirs in mountain districts.

19. Accounts of existing water-works, and the distribution of the water.

20. The means of improving the water-supply of the metropolis.

21. Structural details, and results in use, of apparatus for filtration of large volumes of water.

22. Drainage and sewerage of large towns, exemplified by accounts of the systems at present pursued.

24. Iron paving compared with stone block-paving.

32. Lighthouses, their machinery and lighting apparatus.

GAS-LIGHT COMPANIES IN THE UNITED STATES.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1857	ADRIAN	Mich.	50,000	50	—	May & November.	4,000	3 50	....	....	
1856	AKRON	O.	20,000	33⅓	—	Do.	3,500	3 00	....	....	
1845	ALBANY	N. Y.	250,000	20	4	January & July.	65,000	3 00	120	....	None in market.
1858	ALBION	N. Y.	80,000	100	—	Do.	3,000	3 80	....	....	
1851	ALEXANDRIA	Va.	106,530	—	—	City Works.	9,000	3 50	....	....	
1852	ALLEGHANY	Pa.	200,000	25	4	May & November.	25,000	3 00	....	....	
1858	ALLENTOWN	Pa.	60,000	100	3½	Do.	5,000	3 50	....	....	
1857	ALTON	Ill.	75,000	—	—	Private Works.	4,000	3 50	....	....	
1859	ALTOONA	Pa.	40,000	20	4	January & July.	5,000	3 00	....	....	
1839	AMESBURY AND SALISBURY	Mass.	30,000	25	—	Do.	7,000	4 00	....	....	
1858	ANNAPOLIS	Md.	100,000	25	—	Do.	4,000	4 00	....	....	
1858	ANN ARBOR	Mich.	23,000	50	5	March & September.	5,500	4 00	....	....	
1858	ASTORIA	N. Y.	20,000	50	—	Do.	6,000	4 00	....	....	
1855	ATLANTA	Ga.	50,000	25	5	January & July.	12,000	5 00	....	....	
1857	ATTLEBORO'	Mass.	6,000	50	3	Do.	2,000	6 00	....	....	
1850	AUBURN	N. Y.	80,000	50	5	Do.	10,000	7 00	....	....	
1851	AUGUSTA	Ga.	80,000	25	8	Do.	9,000	6 00	....	....	
1838	AUGUSTA AND HALLOWELL	Me.	84,700	50	5	Do.	10,000	4 00	....	....	
1860	AURORA	Ind.	10,000	—	—	Private Works.	3,500	3 50	....	....	{ Formerly used Sanders' Water-Gas. Recently altered to Coal Gas-Works.
1817	BALTIMORE	Md.	550,000	100	5	June & December.	150,000	2 50	150	....	None for sale.
1852	BANGOR	Me.	120,000	100	2½	January & July.	12,000	3 00	100	....	
1855	BATAVIA	N. Y.	32,000	20	4	Do.	2,500	4 00	100	100	Stock firm. Good works and well managed.
1858	BATH	Me.	65,000	100	3	April & October.	10,000	3 75	...	...	
1859	BATH	N. Y.	15,000	50	—	May & November.	3,000	7 00	....	....	
1861	BATTLE CREEK	Mich.	15,000	—	—	January & July.			....	....	
1858	BELFAST	Me.	14,000	100	—	Do.	7,000	7 00	....	....	
1836	BELLEFONT	Pa.	20,000	25	2	Do.	3,500	4 00	....	....	
	BELOIT	Wis.	30,000	—	—	Do.	4,000	4 00	....	....	
1854	BETHLEHEM	Pa.	50,000	50	4	June & December.	2,000	3 20	...	....	
1859	BEVERLY	Mass.	40,000	100	—	January & July.	4,000	4 00	....	....	
1858	BINGHAMPTON	N. Y.	50,000	50	3½	Do.	10,000	4 00	....	....	
1849	BIRMINGHAM	Pa.	40,000	50	—	Do.	4,000	4 00	....	....	
1855	BLOOMINGTON	Ill.	40,000	50	—	Do.	6,000	4 00	...	....	
1858	BORDENTOWN	N. J.	50,000	25	3	June & December.	4,000	3 80	....	....	
1822	BOSTON	Mass.	1,000,000	500	5	Do.	180,000	2 25	....	....	
1859	BRATTLEBORO'	Vt.	21,000	—	—	Do.	8,000	4 00	....	....	
1851	BRIDGEPORT	Ct.	90,000	25	4	January & July.	10,000	4 00	90	....	Passed last dividend.
1857	BRIDGETON	N. J.	50,000	20	—	Do.	5,000	4 00	....	...	
1856	BRISTOL	Pa.	30,000	25	3	February & August.	3,000	4 00	....	....	
1855	BRISTOL	R. I.	35,000	50	2	January & July.	6,000	4 00	....	....	
1859	BROCKPORT	N. Y.	25,000	100	3	Do.	1,500	4 00	....	....	
1858	BROOKLINE	Mass.	66,000	100	3½	February & August.	3,500	3 50	....	....	
1825	BROOKLYN	N. Y.	2,000,000	25	5	January & July.	75,000	2 50	170	160	
	BROWNSVILLE	Pa.				Do.			....	....	
1848	BUFFALO	N. Y.	600,000	50	5	Do.	70,000	2 90	140	125	
1852	BURLINGTON	N. J.	100,000	25	3½	Do.	5,000	4 00	105	....	
1858	BURLINGTON	Vt.	75,000	25	2½	Do.	10,000	4 50	....	....	
1859	BURLINGTON	Iowa.	65,000	50	—	Do.	8,000	4 00	....	....	
1861	CALAIS	Me.	20,000	100	—	Do.	10,000	3 50	....	....	
1852	CAMBRIDGE	Mass.	300,000	100	5	February & August.	20,000	3 50	100	97½	
1852	CAMDEN	N. J.	300,000	100	3	April & October.	15,000	3 50	105	100	
1853	CANANDAIGUA	N. Y.	50,000	50	—	January & July.	3,000	4 00	90	80	
1856	CANTON	O.	19,000	50	6	March & September.	6,000	3 00	....	....	
1853	CAPE ISLAND	N. J.	80,000	100	—	October.	10,000	6 00	....	...	{ Watering place —These Works only run in summer.
1860	CARBONDALE	Pa.	16,000	25	—	March & September.	5,000	4 00	....	....	
1855	CARLISLE	Pa.	30,000	25	—	January & July.	4,000	4 00	....	...	
1856	CATASAUQUA	Pa.	15,000	25	5	May & November.	2,000	4 00	....	....	
1858	CATSKILL	N. Y.		—	—	Private Works.	3,000	3 00	....	....	Owned by G. T. Sutton.
1857	CHAMBERSBURG	Pa.	30,000	25	—	January & July.	3,000	4 00	....	....	
1846	CHARLESTON	S. C.	723,800	25	4	Do.	50,000	4 00	....	...	
1851	CHARLESTOWN	Mass.	200,000	50	4	Do.	30,000	3 00	105	...	
1858	CHARLOTTE	N. C.	14,000	50	10	March & September.	3,500	6 00	....	....	
1859	CHARLOTTEVILLE	Vt.	15,000	25	—	Do.	4,000	4 50	....	...	
1851	CHELSEA	Mass.	100,000	100	3½	January & July.	8,000	3 50	....	....	
1856	CHESTER	Pa.	35,000	25	3	April & October.	4,000	4 00	....	....	
1849	CHICAGO	Ill.	1,300,000	25	5	January & July.	100,000	2 50	150	140	Very scarce. Stock wanted.
1857	CHICOPEE	Mass.	50,000	20	—	Do.		4 00	....	....	
1851	CHILLICOTHE	O.	40,000	25	4	Do.	12,000	3 50	....	....	
1841	CINCINNATI	O.	1,600,000	100	5	Do.	225,000	2 50	....	....	
1859	CITIZENS', BROOKLYN	N. Y.	1,000,000	20	—	Do.	135,000	2 00	128	125	
1860	CITIZENS', READING	Mass.	90,000	100	—				....	....	
	CLARKESVILLE	Tenn.	100,000	50	—	Do.	5,000	4 00	....	....	
1860	CLAREMONT	N. H.	20,000	100	—	March & September.	3,000	4 00	....	....	
1846	CLEVELAND	O.	200,000	10	5	January & July.	20,000	3 00	....	....	
1858	CLINTON	Mass.	30,000	500	5	Do.	3,000	4 00	....	...	
1859	CLYDE	N. Y.	10,000	50	4	Do.	2,500	4 00	....	....	
1854	COHOES	N. Y.	50,000	20	3½	April & October.	5,000	3 60	....	....	
1860	COLD SPRING	N. Y.	30,000	50	—	Do.	3,500	4 00	80	....	{ Formerly Rosin-Gas, but now Coal. A well managed company. Stock firmly held.
1860	COLD WATER	Mich.	25,000	50	5	January & July.	4,000	4 00	....	....	
1852	COLUMBIA	Pa.	37,500	25	—	Do.	4,000	3 50	....	....	
1852	COLUMBIA	S. C.	44,000	25	4	Do.	6,000	6 00	....	....	
1857	COLUMBIA	Cal.	50,000	25	—	Do.	4,500	10 00	....	....	
1858	COLUMBUS	Ga.	54,000	25	5	Do.	5,000	7 00	....	....	
1850	COLUMBUS	O.	100,000	10	6	Do.	30,000	3 00	....	....	
1858	CONCORD	N. H.	50,000	50	5	Do.	8,000	3 50	....	....	
1858	COVINGTON AND NEWPORT	Ky.	100,000	50	3½	Do.	28,000	4 00	...	....	
1854	CUMBERLAND	Md.	60,000	50	3	Do.	6,000	4 00	....	....	
1857	DANBURY	Ct.	50,000	25	4	Do.	2,000	3 75	....	...	
1856	DANVILLE	Pa.	30,000	25	—	June & December.	3,000	4 00	....	....	
1855	DAVENPORT	Iowa.	56,000	100	—	Do.	6,000	5 00	....	....	
1848	DAYTON	O.	50,000	25	5	February & August.	8,000	3 50	....	....	
1853	DEDHAM	Mass.	40,000	50	—	January & July.	3,000	4 00	....	....	
1860	DELAWARE	O.	30,000	25	—	Do.	2,500	3 00	....	....	
1849	DETROIT	Mich.	500,000	50	5	Do.	30,000	3 50	160	150	Excellent Stock. No sales.
1860	DOBBS' FERRY	N. Y.	25,000	—	—	Do.	3,000	4 00	....	....	
1854	DORCHESTER	Mass.	150,000	100	—	Do.	14,000	4 00	....	....	
1859	DOVER	Del.	12,000	—	—	Private Works.	2,000	4 00	....	....	
	DOVER	N. H.				January & July.			....	....	
1857	DOYLESTOWN	Pa.	50,000	—	—	Do.	3,000	4 00	....	....	
1854	DUBUQUE	Iowa.	100,000	50	—	Do.	17,000	4 50	....	....	
1853	EAST BOSTON	Mass.	133,000	25	4	Do.	20,000	3 50	....	145	No transactions.
1858	EAST GREENWICH	R. I.	11,200	100	15	Do.	3,000	7 00	....	...	
1861	EAST HAMPTON	Mass.	10,000	25	—	Do.	5,000	9 00	....	....	
1861	EAST NEW YORK	N. Y.	50,000	50	—	Do.	12,000	3 50	....	....	
1857	EASTON	Md.	9,000	10	—	Do.	1,500	7 00	....	....	
1850	EASTON	Pa.	125,000	50	4	June & December.	6,000	3 60	....	....	
1856	EASTPORT	Me.	50,000	55	—	Do.	3,000	4 00	....	....	
1855	ELIZABETH	N. J.	100,000	20	4	January & July.	14,000	3 50	....	....	
	ELLICOTT'S MILLS	Md.	10,000	—	—	Do.	4,000	4 00	....	....	
1852	ELMIRA	N. Y.	50,000	25	3½	Do.	5,000	4 00	....	...	
1852	ERIE	Pa.	68,000	50	3½	June & December.	10,000	3 00	....	....	
1853	EVANSVILLE	Ind.	60,000	50	4	January & July.	12,000	4 00	110	....	A very good Company.
	EXETER	N. H.	60,000	—	—	Do.	12,000		...	...	
	FAIR HAVEN	Ct.	20,000	25		Do.	8,000	4 00	....	....	
1847	FALL RIVER	Mass.	26,000	—	—	[Private Works.	12,000	3 50	....	....	
1859	FAYETTEVILLE	N. C.	25,000	100	6	January & July.	7,000	6 00	....	....	
	FIFTH WARD (Milwaukee)	Wis.	50,000	25	—	Do.	10,000	4 00	....	...	
1857	FISHKILL	N. Y.	10,000	20	—	April & October.	1,500	9 00	....	....	
1853	FITCHBURG	Mass.	100,000	50	3	January & July.	5,000	4 00	....	....	Make Petroleum-Gas.
1859	FLEMINGTON	N. J.	20,000	—	—	Do.	3,000	4 00	...	....	
1855	FLUSHING	N. Y.	20,000	50	1½	March & September.	6,500	4 00		....	
1858	FORT WAYNE	Ind.	40,000	25	—	Do.	6,000	4 00	...	....	
1851	FRANKFORT	Ky.	50,000	—	—	City Works.	5,500	4 50	...	...	
1851	FREDERICK CITY	Md.	86,000	100	—	January & July.	5,000	6 70	....	....	
1854	FREDERICKSBURG	Va.	72,500	50	5	Do.	4,500	4 00	....	....	
1858	FREDONIA (Natural Gas)	N. Y.	10,000	100	—	Do.	2,000	4 00	....	....	Unlimited supply of Natural Gas.
1856	FREEPORT	Ill.	20,000	100	—	May & November.	10,000	4 00	....	....	

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When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1859	REMONT	O.	25,000	25	—	May & November.	2,000	4 50	....	....	
1858	FULTON	N. Y.	12,000	100	—	Do.	4,000	7 00	....	....	
								4 00	....	....	
1855	GALENA	Ill.	70,000	100	—	Do.	8,000	4 00	....	....	
1859	GALION	O.	25,000	25	—	January & July.	1,800	3 00	....	....	
1858	GALVESTON	Texas.	150,000	50	—	May & November.	7,000	6 00	....	....	
1854	GARDINER	Me.	100,000	50	4	Do.	8,000	4 00	....	....	
1853	GENEVA	N. Y.	75,000	25	2½	Do.	6,000	4 00	....	....	
1851	GERMANTOWN	Pa.	Merged	into	the	Philadelphia Works.	12,000	2 25	....	....	
1859	GETTYSBURG	Pa.	20,000	50	3	January & July.	2,500	4 00	....	....	
1854	GLENN'S FALLS	N. Y.	35,000	50	3	February & August.	4,000	4 00	....	....	
1854	GLOUCESTER	Mass.	40,000	50	—	January & July.	5,000	3 50	....	....	
1857	GLOVERSVILLE	N. Y.	15,000	25	—	Do.	3,000	3 50	....	....	
1858	GRAND RAPIDS	Mich.	50,000	20	—	Do.	3,000	4 00	....	....	
1855	GREAT BARRINGTON	Mass.	5,000	100	5	April & October.	2,000	7 00	....	....	
1849	GREAT FALLS	N. H.	50,000	100	3	Do.	3,000	4 00	...	....	
1860	GREENFIELD	Mass.	20,000	50	2	January & July.	2,500	4 00	....	....	Close corporation.
1858	GREENPOINT	N. Y.	100,000	50	5	Do.	20,000	3 00	....	....	
1859	GREENSBORO'	N. C.	12,000	50	—	April & October.	3,000	7 00	....	...	
1858	GREENSBURG	Pa.	30,000	25	3	May & November.	2,000	3 00	....	....	
1854	HAGERSTOWN	Md.	15,000	20	—	January & July.	2,000	6 00	....	....	
	HAMILTON	O.	15,000			Do.			....	....	
1850	HANNIBAL	Mo.	100,000	100	—	Do.	6,000	3 50	....	....	
1857	HARLEM	N. Y.	350,000	50	3½	Do.	25,000	3 00	....	145	
1855	HARRISBURG	Pa.	100,000	—	4	Do.	5,000	4 00	...	....	
1849	HARTFORD	Ct.	200,000	25	4	Do.	25,000	3 00	150	140	Stock in demand.
	HASTINGS	N. Y.				Do.	8,000	4 00	...	....	
1853	HAVERHILL	Mass.	50,000	50	—	Do.	5,000	4 00	....	....	
1859	HAVERSTRAW	N. Y.	20,000	100	—	Do.	5,000	4 00	....	....	
1861	HAYESVILLE	Mass.	15,000	25		Do.	4,000	4 00	....	....	
1850	HEMPSTEAD	N. Y.	16,000	25	—	Do.	1,000	4 00	....	....	
1862	HOBOKEN	N. J.	100,000	25	3	Do.	30,000	2 50	....	100	Works not yet built.
1856	HOLLIDAYSBURG	Pa.	30,000	25	2	Do.	4,000	3 50	....	....	
1861	HOLYOKE	Mass.	20,000	25	—	Do.	3,000	4 00	....	....	
1861	HOMER & CORTLANDT	N. Y.	40,000	100	—	Do.	6,000	4 00	....	....	
1854	HONESDALE	Pa.	30,000	25	3	Do.	2,500	4 00	...	....	
1860	HORNELLSVILLE	N. Y.	12,000	50	—	Do.	2,000	4 00	....	....	
1853	HUDSON	N. Y.	50,000	100	3½	February & August.	3,000	4 00	....	....	
	HUNTER'S POINT	N. Y.									
1857	HUNTINGTON	Pa.	18,000	50	3	Do.	2,000	3 50	....	....	
1856	HUNTSVILLE	Ala.	7,325	25	—	June & December.	2,000	5 00	....	....	
	INDIANAPOLIS	Ind.	150,000	—	—	Do.	15,000	5 00	....	....	
1857	IOWA CITY	Iowa.	40,000	50	—	February & August.	4,000	4 50	....	....	
1852	ITHACA	N. Y.	75,000	25	3½	January & July.	6,000	4 00	....	....	
1857	JACKSON	Mich.	25,000	50	5	Do.	6,000	3 50	....	....	
	JACKSON	Miss.	80,000	50	—	Do.	4,000	4 50	....	....	
	JACKSON	Cal.	50,000	30	—	Do.	4,000	10 00	....	....	
	JACKSONVILLE	Flor.	30,000	20	—	Do.	2,000	7 00	....	....	
	JACKSONVILLE	Ind.	50,000	50	—	Do.	4,000	5 00	....	....	
1858	JACKSONVILLE	Mo.	25,000	25	—	Do.	7,000	6 00	....	....	
1856	JAMAICA	N. Y.	20,000	—	4	Do.	6,000	4 00	....	....	
1853	JAMAICA PLAIN	Mass.	75,000	100	3½	Do.	3,000	3 50	....	....	
	JAMESTOWN	N. Y.	25,000	—	—	Do.	4,000	4 00	....	....	
1856	JANESVILLE	Wis.	50,000	100	—	Do.	12,000	4 00	....	....	
	JEFFERSONVILLE	Md.	30,000	25		Do.	4,000	4 00	....	....	
1853	JERSEY CITY	N. J.	300,000	—	5	Do.	30,000	3 00	150	....	No sales since formation of Hoboken Co.
1858	JERSEY SHORE	Pa.	15,000	25	—	Do.	2,000	3 70	....	....	
1856	JOHNSTOWN	Pa.	80,000	25	3	Do.	8,000	3 00	....	....	
1857	JOLIET	Ill	300,000	100	—	June & December.	6,000	4 00	....	....	
1858	KALAMAZOO	Mich.	30,000	50	5	Do.	10,000	4 00	....	....	
1860	KEENE	N. H.	60,000	100	—	Do.	4,500	4 00	....	....	
1855	KEOKUK	Iowa.	100,000	100	—	January & July.	10,000	4 50	....	....	
1855	KINGSTON	Pa.	50,000	50	—	Do.	3,000	4 00	....	....	
1859	KITTANNING	Pa.	20,000	—	—	Doubtful.	5,000	4 00	....	....	Said to be a fraud.
1854	KNOXVILLE	Tenn.	63,000	—	—	April & October.	4,000	5 00	....	....	
1860	LACONIA	N. H.	20,000	100	—	Do.	4,000	6 00	....	....	
1859	LA CROSSE CITY	Wis.	100,000	50	—	June & December.	10,000	5 00	....	....	
1854	LAFAYETTE	Ind.	60,000	50	4	January & July.	10,000	3 25	....	....	
1856	LAMBERTVILLE	N. J.	30,000	25	—	Do.	2,600	4 00	....	....	
1849	LANCASTER	Pa.	100,000	50	4	Do.	10,000	3 00	....	....	
1856	LANCASTER	O.	25,000	100	5	Do.	5,000	3 50	....	....	
1855	LANSINBURG	N. Y.	25,000	100	—	Private Works.	7,000	4 00	....	....	
1849	LAWRENCE	Mass.	200,000	100	4	February & August.	15,000	3 50	....	....	
1859	LEAVENWORTH	Kansas.	200,000	25	—	January & July.	10,000	5 00	....	....	
1856	LEBANON	Pa.	26,000	50	—	February & August.	5,000	4 00	....	....	
1861	LE ROY	N. Y.	25,000	50	—	Do.	4,000	4 00	....	....	
1858	LEWISBURG	Pa.	20,000	100	—	January & July.	4,000	4 00	....	...	
1852	LEWISTON	Me.	100,000	100	3	Do	10,000	3 20	....	....	
1856	LEWISTOWN	Pa,	30,000	50	3	April & October.	3,000	3 10	....	....	
1858	LEXINGTON	Ky.	100,000	25	4	January & July.	5,000	4 00	....	....	
1858	LITTLE FALLS	N. Y.	112,000	25	—	Do.	3,500	7 00	....	....	
1861	LITTLE ROCK	Ark.	20,000	—	—	Do.	5,000	6 00	....	....	
1858	LOCKHAVEN	Pa.	28,000	—	—	Do.	3,000	4 00	....	....	
	LOCKPORT	N. Y.	100,000	50	—	Do.	4,000	4 00	....	....	
1838	LOUISVILLE	Ky.	600,000	50	6	Do.	80,000	2 50	125	....	But $481,400 stock has been sold. This Company has a large contingent fund and undivided profit on hand.
1849	LOWELL	Mass.	200,000	25	5	Do.	50,000	3 25	....	....	
1852	LYNCHBURG	Va.	70,000	25	5	Do.	6,000	3 80	....	....	
1852	LYNN	Mass.	55 000	50	4	Do.	20,000	4 00	....	....	
1859	LYONS	N. Y.	30,000	100	—	Do.	4,000	4 00	....	....	
1852	MACON	Ga.	75,160	25	6	Do.	5,000	5 00	....	....	
1851	MADISON	Ind.	160,000	25	3	Do.	10,100	3 50	....	....	
1855	MADISON	Wis.	100,000	25	—	Do.	5,000	5 00	....	....	
1854	MALDEN & MELROSE	Mass.	50,000	25	3	February & August.	5,000	4 00	....	....	
1852	MANAYUNK	Pa.	40,000	100	—	Do.	7,000	4 00	....	....	
1852	MANCHESTER	N. H.	100,000	100	5	January & July.	25,600	3 00	....	....	
1830	MANHATTAN (N. Y. City)	N. Y.	4,000,000	50	5	Do.	600,000	2 50	300	375	
	MANSFIELD	O.	25,000	—	—	Do.	10,000	4 00	....	....	
1854	MARBLEHEAD	Mass.	40,000	100	3	Do.	1,000	4 00	....	....	
	MARLBORO'	Mass.	20,000	—	—	Do.	8,000	4 00	....	....	
	MAUCH CHUNK	Pa.	50,000	50	—	Do.	7,000	4 00	....	....	
1857	MARIETTA	O.	50,000	50	—	Do.	7,000	4 00	....	....	
1860	MARION	O.	12,000	25	5	April & October.	1,500	3 55	....	....	Stock firm.
1858	MARYSVILLE	Cal.	50,000	100	—	January & July.	4,000	12 50	....	....	
1857	MASSILON	O.	20,000	25	—	Do.	5,000	3 00	....	....	
1855	MEADVILLE	Pa.	39,500	25	—	Do.	4,000	3 50	....	....	
	MEDINA	N. Y.	2,000	100	—	Do.	2,000	7 00	....	....	
1852	MEMPHIS	Tenn.	300,000	100	5	June & December.	12,000	3 50	....	....	
	MERIDEN	Ct.	20,000			Do.			....	....	
1859	METROPOLITAN (N. Y. City)	N. Y.	1,000,000	100	—	January & July.	200,000	2 50	....	....	
1859	MIDDLEBORO'	Mass.	15,000	—	—	Private Works.		6 00	....	....	
1858	MIDDLETOWN	Ct.	50,000	25	3	March & September.	5,000	3 80	....	....	
	MIDDLETOWN	N. Y.		25	—	Private Works.	3,000	3 00	....	....	Owned by G. T. Sutton.
	MILFORD	Mass.	20,000	—	—	Do.		4 00	...	....	
	MILLEDGEVILLE	Ga.	100,000	50	—	Do.		5 00	...	....	
	MILTON	Pa.	10,000			Do.			...	....	
1847	MILWAUKEE	Wis.	400,000	50	5	January & July.	24,000	3 50	150	....	
1852	MOBILE	Ala.	200,000	—	—	Do.	30,000	4 50	....	....	
1856	MONROE	Mich.	40,000	50	—	Do.	5,000	3 50	50	....	
1852	MONTGOMERY	Ala.	100,000	25	4	February & August.	7,000	6 00	....	....	
1856	MONTPELIER	Vt.	30,000	25	3	January & July.	5,000	4 50	....	....	
1859	MORRISANIA	N. Y.	30,000	50	—	Do.		4 00	....	....	
1859	MORRISTOWN	N. J.	18,000	50	—	Do.	3,500	4 00	....	....	
1854	MOUNT HOLLY	N. J.	16,650	25	3	April & October.	2,000	7 00	....	....	
	MOUNT VERNON	O.	50,000	100	—	Do.		4 00	....	....	
1857	MUSCATINE	Iowa.	50,000	100	—	January & July.	3,000	4 50	...	....	
1854	NANTUCKET	Mass.	50,000	100	3	February & August.	6,000	4 00	...	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1852	Nashua	N. H.	45,000	50	3½	January & July.	10,000	3 50	.....	....	
1850	Nashville	Tenn.	200,000	50	5	Do.	25,000	3 50	....	....	
1858	Natchez	Miss.	46,000	50	—	Do.	20,000	5 00	....	....	
1852	New Albany	Ind.	200,000	50	3½	Do.	16,000	3 50	....	....	
1846	Newark	N. J.	362,000	50	5	Do.	45,000	3 62	130	....	Always a favorite stock.
1856	Newark	O.	30,000	100	—	Do.	7,000	5 40	....	....	
1852	New Bedford	Mass.	130,000	100	5	Do.	15,000	2 90	102	....	Well managed and kept quiet.
1859	Newbern	N. C.	22,000	100	6	Do.	6,000	3 50	....	....	
	New Britain	Ct.	30,000	20	5	Do.	3,000	4 00	....	....	
1851	New Brunswick	N. J.	100,000	20	4	Do.	8,000	3 00	115	....	
1852	Newburg	N. Y.	67,000	20	4	Do.	10,000	4 00	105	....	
1852	Newburyport	Mass.	150,000	10	4	Do.	9,000	4 00	92½	....	
1857	Newcastle	Del.	32,300	10	3	Do.	4,000	4 00	90	....	
1847	New Haven	Ct.	250,000	25	4	Do.	30,000	3 00	155	....	None in market.
1858	New London	Ct.	70,000	50	3	Do.	12,000	4 00	105	....	Do.
1835	New Orleans	La.	1,500,000	100	6	Do.	120,000	4 00	180	....	
1853	Newport	R. I.	130,200	100	4	Do.	10,000	3 50	112	....	
1854	Newton & Watertown	Mass.	300,000	100	2	Do.	10,000	4 00	....	....	
	Newton	N. J.	30,000	—	—	Do.	3,000	4 00	....	....	
	Newton	Pa.	20,000	50	—	Do.	2,500	4 00	....	....	
1823	Newtown	N. Y.									
1859	New York	N. Y.	1,000,000	50	5	May & November.	100,000	2 50	300	....	
	Niagara Falls	N. Y.	15,000	25	—	Do.	3,000	4 00	90	....	
	Norfolk	Va.	60,000	25	—	Do.	40,000	4 00	....	....	
1853	Norristown	Pa.	41,700	25	4	June & December.	8,000	3 50	....	....	
1855	North Attleboro'	Mass.	50,000	100	3½	Do.	6,000	4 00	....	....	
	Northern Liberties	Pa.	400,000	25	7	City Works.	40,000	2 50	....	....	
	North Adams	Mass.	25,000	—	—	March & September.	30,000	4 00	....	....	
1856	Northampton	Mass.	35,000	25	3	January & July.	4 500	4 00	....	....	
1859	North Bridgewater	Mass.	16,000	100	4	June & December.	1,000	7 00	....	....	
1856	Norwalk	Ct.	30,000	150	4	February & August.	6,000	4 00	....	....	
1856	Norwalk	O.	30,000	25	—	January & July.	4,000	4 00	....	....	
1854	Norwich	Ct.	75,000	25	3½	Do.	12,000	3 50	....	....	
1861	Norwich	N. Y.	12,000	50	—	Do.	2,500	4 00	....	....	
1859	Nyack	N. Y.	20,000	100	—	Do.	2,500	4 00	....	....	
1860	Oberlin	O.	10,000	—	—	Do.	1,200	4 00	....	....	
1855	Ogdensburg	N. Y.	75,000	50	5	Do.	9,000	4 00	....	....	
1859	Orange	N. J.	65,000	25	—	Do.	6,000	3 50	....	....	
1852	Oswego	N. Y.	81,250	100	3½	Do.	15,000	4 00	105	....	Good works, built by Hoy, Jr., & Kennedy.
1855	Ottawa	Ill.	45,000	100	6½	Do.	6,000	4 00	....	....	
1856	Owego	N. Y.	40,000	50	3½	Do.	5,000	4 00	....	....	
1860	Owensboro'	Ky.	25,000	25	—	Do.	4,000	3 50	....	....	
1856	Paducah	Ky.	75,000	100	—	May & November.	4,000	5 00	....	....	
1861	Painsville	O.	40,000	25	5	Do.	2,500	5 00	....	....	
1856	Palmyra	N. Y.	12,000	25	—	January & July.	3,000	7 00	....	....	
1847	Paterson	N. J.	125,000	25	3	Do.	20,000	3 50	95	....	
1850	Pawtucket	R. I.	75,000	50	4	Do.	12,000	3 00	....	....	
1855	Peekskill	N. Y.	31,000	50	3	June & December.	4,000	4 00	....	....	Surplus $10,000, May 15, 1863.
1860	Penn Yan	N. Y.	12,000	50	5	Do.	3,000	4 00	....	....	Works leased to Gilbert T. Sutton.
1859	Peoples', Chicago	Ill.	500,000	50	New	Do.	100,000	2 50	....	....	
1858	Peoria	Ill.	100,000	50	4	Do.	8,000	3 50	....	....	What is this Company doing?
1852	Petersburg	Va.	120,000	—	5	January & July.	20,000	3 80	....	....	
1841	Philadelphia	Pa.	3,000,000	50	—	City Works.	650,000	2 00	....	....	
1855	Piqua	O.	50,000	50	—	January & July.	6,500	4 00	....	....	
1835	Pittsburg	Pa.	300,000	100	5	Do.	60,000	1 50	115	....	
1854	Pittsfield	Mass.	50,000	100	5	Do.	4,500	4 00	....	....	
1858	Placerville	Cal.	30,000	50	—	Do.	4,500	10 00	....	....	
1860	Plainfield	N. J.	25,000	50	—	Do.	2,500	4 00	....	....	
1859	Plattsburg	N. Y.	16,000	50	—	January & July.	5,000	7 00	....	....	
1858	Plymouth	Mass.	40,000	100	—	April & October.	8,000	4 00	....	....	
1860	Port Chester	N. Y.	50,000	50	—	Do.	4,000	4 00	....	....	
1860	Port Jervis	N. Y.	20,000	100	—	Do.	3,000	4 10	....	....	
1849	Portland	Me.	300,000	50	4	January & July.	30,000	3 00	....	....	
1853	Portland	Oreg.	50,000	50	—	Do.	3,500	8 00	....	....	
1859	Port Lavacca	Texas.	50,000	100	—	Do.	2,500	7 00	....	....	
1851	Portsmouth	N. H.	70,000	100	8	April & October.	6,500	3 70	....	....	
1855	Portsmouth	O.	50,000	50	4	January & July.	10,000	3 50	....	....	
1855	Portsmouth	Va.	100,000	50	4	Do.	4,000	4 00	....	....	
1856	Pottstown	Pa.	20,000	50	3	Do.	3,500	4 00	....	....	
1850	Pottsville	Pa.	110,000	50	2	Do.	10,000	3 50	....	....	
1850	Poughkeepsie	N. Y.	84,000	25	4	March & September.	15,000	3 50	120	110	
1848	Providence	R. I.	1,000,000	50	4	January & July.	60,000	3 00	122	....	
1855	Quincy	Ill.	300,000	50	4	June & December.	12,000	3 50	....	....	
	Quincy	Mass.	00,000	00	—	Do.	00,000	0 00	....	....	
1855	Racine	Wis.	43,500	26	—	Do.	7,000	3 50	....	....	
1857	Rahway	N. J.	50,000	20	—	January & July.	5,000	4 00	....	....	
1858	Raleigh	N. C.	25,000	100	6	May & November.	5,000	6 00	....	....	
1848	Reading	Pa.	100,000	25	4	January & July.	25,000	3 00	....	....	
1851	Richmond	Va.	341,975	—	—	City Works.	30,000	3 00	....	....	Jeff. Davis has extinguished the gas-lights of Richmond, Va.
1859	Richmond	Mass.	40,000	25	—	January & July.	3,000	4 00	....	....	
	Richmond County	N. Y.									
1859	Ripley	O.	30,000	50	—	Do.	2,000	4 50	....	....	
1852	Rochester	N. Y.	200,000	50	5	Do.	50,000	2 50	....	....	
1857	Rockford	Ill.	40,000	50	—	Do.	4,000	4 00	....	....	
1854	Rock Island	Ill.	100,000	50	—	Do.	6,000	4 50	....	....	
1854	Rockland	Me.	50,000	100	—	Do.	6,000	4 40	....	....	
1852	Rome	N. Y.	85,000	100	3½	Do.	10,000	3 60	....	....	
1854	Rondout and Kingston	N. Y.	65,150	20	3½	June & December.	10,000	3 80	....	....	
1854	Roxbury	Mass.	150,000	100	5	January & July.	20,000	3 50	....	....	
1859	Rutland	Vt.	20,000	25	—	Do.	4,000	3 50	....	....	
	Saco	Me.	71,600	100	3½	April & October.	8,000	4 00	....	....	
1857	Sacramento	Cal.	500,000	100	—	Do.	40,000	10 00	....	....	
1850	Sag Harbor	N. Y.	20,000	—	—	Do.	4,000	4 00	....	....	
1858	Saint Albans	Vt.	15,000	20	—	Do.	3,000	7 00	....	....	
	Saint Johnsbury	Vt.	30,000	25	—	Do.	4,000	4 00	....	....	
1857	Saint Joseph	Mo.	50,000	100	5	January & July.	6,000	5 00	....	....	
1859	Saint Louis	Mo.	600,000	50	—	June & December.	180,000	3 50	....	....	
1857	Saint Paul	Min.	200,000	50	3	January & July.	10,000	6 00	....	....	Surplus $10,000, May 15, 1863.
1856	Salem	N. J.	30,000	25	3	Do.	5,000	3 86	....	....	
1850	Salem	Mass.	200,000	100	4	February & August.	30,000	3 24	....	....	
1859	Salem	O.	25,000	20	—	Do.	3,000	3 00	....	....	
1859	Salisbury	N. C.	14,600	50	6	May & November.	3,500	6 00	....	....	
	Salisbury Mills	Mass.	1,250	25	—	Do.	3,000	4 00	....	....	
	Salmon Falls	Me.	25,000	100	—	Do.	3,000	4 00	....	....	
	San Antonio	Texas.	75,000	20	—	Do.	40,000	6 00	....	....	
	San Diego	Cal.	30,000	50	—	Do.	50,000	10 00	....	....	
1854	Sandusky	O.	75,000	50	—	April & October.	9,000	3 00	....	....	
1859	Sandwich	Mass.	10,000	—	—	Private Works.	2,000	3 50	....	....	
1852	San Francisco	Cal.	1,000,000	100	6	Do.	50,000	8 00	110	....	
1853	Saratoga Springs	N. Y.	39,000	100	—	January & July.	6,000	3 60	70	....	
	Saugerties	N. Y.	30,000	20	—	Do.	4,000	3 00	....	....	
1849	Savannah	Ga.	200,000	25	5	Do.	10,000	3 75	....	....	
1851	Schenectady	N. Y.	50,000	—	—	Private Works.	11,000	4 00	....	....	
1858	Scranton, Gas and Water	Pa.	100,000	25	—	January & July.	6,000	3 80	.....	....	About trying Water-Gas.
1857	Selma	Ala.	20,000	100	—	Do.	2,000	5 00	....	....	
1856	Seneca Falls and Waterloo	N. Y.	80,000	50	3	Do.	10,000	4 00	100	....	
	Shreveport	La.	40,000	25	—	Do.	3,000	0 50	....	....	
1856	Sing Sing	N. Y.	40,000	100	—	Do.	3,000	3 50	....	....	
	Smyrna	Del.						4 00	....	....	Petroleum Gas.
1860	South Adams	Mass.	10,000	25	—	Do.	3,000	4 00	....	....	
1859	South Bridge	Mass.	5,000	25	—	Do.	4,010	6 00	....	....	
	South Boston	Mass.	200,000	50	—	Do.	60,000	3 25	110	....	
	Springfield	O.	200,000	100	—	Do	20,000	3 50	....	....	
1854	Springfield	Ill.	75,000	50	—	January & July.	10,000	3 50	....	....	
1848	Springfield	Mass.	100,000	500	5	February & August.	10,000	3 60	140	....	
1855	Stamford	Ct.	6,250	25	5	April & October.	3,000	3 50	....	....	
1857	Staten Island	N. Y.	150,000	50	5	January & July.	26,000	4 00	95	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1859	Staunton	Va.	18,000	50	6	January & July.	4,000	7 00	....	....	
	Steubenville	O.	150,000	100	—	Do.	15,000	4 00	....	....	
	Stockton	Cal.	50,000	—	—	Do.	8,000	10 00		....	
1848	Syracuse	N. Y.	125,000	25	5	March & September.	25,000	3 00	112	....	
	Tamaqua	Pa.	40,000	25	—	Do.	3,000	4 00	....	....	
1859	Tarrytown and Irvington	N. Y.	70,000	50	—	January & July.	3,000	4 00	....	....	
1858	Taunton	Mass.	100,000	50	4	Do.	10,000	4 00	....	....	
	Terre Haute	Ind.	100,000	100	—	Do.	3,000	4 00	....	....	
	Thompsonville	Ct.	25,000	50	—	Do.	4,000	4 50	....	....	
	Tiffin	O.	25,000	20	—	Do.	4,000	4 00	....	....	
1858	Toledo	O.	100,000	50	3	Do.	8,000	3 50	....	....	
1847	Trenton	N. J.	100,000	20	4	Do.	15,000	3 42	....	110	
1848	Troy	N. Y.	200,000	100	4	June & December.	35,000	3 00	100	....	
1856	Urbana	O.	30,000	25	—	April & October.	3,500	4 00	....	....	
1849	Utica	N. Y.	80,000	100	4	Do.	22,000	3 60	....	....	
1853	Vicksburg	Miss.	66,000	50	—	March & September.	4,000	4 50	....	....	
1850	Vincennes	Ind.	25,000	100	—	January & July.	2,000	4 00	....	....	
1858	Walden	N. Y.	2,500	—	—	Private Works.	1,000	6 00	....	....	
1858	Waltham	Mass.	100,000	100	4	January & July.	3,000	4 00	....	....	
1857	Ware	Mass.	30,000	20	—	Do.	3,500	4 00	....	....	
1861	Warren	O.	30,000	50	—	Do.	4,000	3 00	....	....	
1854	Warren	R. I.	20,000	25	—	Do.	3,000	4 00	....	....	
1855	Washington	D. C.	500,000	20	5	Do.	50,000	2 61	150	148	
1859	Washington	N. C.	15,000	100	—	April & October.	1,500	6 00	....	....	
1848	Washington	Pa.	20,000	25	4	January & July.	4,000	3 00	....	....	
1854	Waterbury	Ct.	100,000	25	—	Do.	4,000	4 00	....	....	
1852	Waterford	N. Y.	12,000	25	—	Do.	4,000	4 00	....	....	
1852	Watertown	N. Y.	20,000	100	—	Do.	10,000	7 00	....	....	
1856	Watertown	Wis.	25,000	100	—	Do.	5,000	5 00	....	....	
1858	Wautoma	Wis.	30,000	50	—	Do.	3,000	4 50	....	....	
1857	Waverly	Miss.	20,000	100	—	April & October.	4,000	5 00	....	....	
1854	West Cambridge	Mass.	60,000	100	—	February & August.	10,000	4 00	....	....	
1852	Westchester	Pa.	100,000	25	2¼	Do.	3,500	3 50	....	....	
	Westfield	Mass.	25,000	100	6	Do.	4,000	4 00	....	....	
	Weston	O.	20,000	25	—	Do.		5 00	....	....	
1857	West Point	N. Y.	50,000	—	—	United States Military	Academy.	2 00	....	....	
1858	West Troy	N. Y.	100,000	50	3	January & July.	10,000	3 60	85	....	
1850	Wheeling	Va.	75,000	25	6	Do.	12,000	2 70	....	....	
	White Plains	N. Y.	20,000	20	—	Do.			....	....	
1856	Wilkesbarre	Pa.	50,000	50	—	May & November.	4,000	3 33	100	80	
1850	Williamsburg	N. Y.	1,000,000	50	5	January & July.	60,000	3 00	....	....	
1858	Williamsburg	Va.	30,000	25	—	Do.	3,000	4 00	....	....	Camp-fires of the Union Army light up this place at present.
1857	Williamsport	Pa.	70,000	25	4	Do.	3,500	3 80	....	....	
1859	Willimantic	Ct.	12,000	—	—	Do.	2,500	3 50	....	....	
1853	Wilmington	N. C.	60,000	50	5	Do.	5,000	5 00	....	....	
1852	Wilmington	Del.	200,000	50	5	February & August.	20,000	3 00	....	....	
1854	Winchester	Va.	36,000	50	6	January & July.	5,000	4 00	....	....	
	Windsor	Vt.									
	Woburn	Mass.	20,000	—	—	Do.	3,000	4 00	....	....	
1856	Woodstock	Vt.	10,000	50	4	Do.	4,000	6 00	....	....	
1853	Woonsocket	R. I.	82,600	100	4	April & October.	4,000	3 50	....	....	
1856	Wooster	O.	25,000	50	—	January & July.	6,000	3 00	....	....	
1849	Worcester	Mass.	160,000	100	5	Do.	15,000	3 50	....	....	
1855	Xenia	O.	40,000	50	—	Do.	3,000	4 00	....	....	
1854	Yonkers	N. Y.	75,000	50	2½	Do.	6,500	4 00	102½	....	
1849	York	Pa.	40,000	57	3	June & December.	10,000	3 50	....	....	
	Yorkville	S. C.	20,000	25	—	Do.	4,000	4 00	....	....	
1858	Ypsilanti	Mich.	20,000	50	5	February & August	6,000	14 00	....	....	
1850	Yreka	Cal.	30,000	100	—	Do.	2,000	0 00	....	....	
1848	Zanesville	O.	44,600	25	4	Do.	10,000	3 50	....	....	

GAS-LIGHT COMPANIES IN THE BRITISH PROVINCES OF NORTH AMERICA.

When Chartered.	Town.	Province	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1854	Belleville	C. W.	23,040	100	4	January & July.	1,200	5 00	....	....	
1854	Brantford	C. W.	32,000	100	2½	Do.			....	....	
	Brockville	C. W.	50,000	—	—	Do.	5,000	4 00	....	....	
	Chatham	N. B.	50,000	—	—				....	....	
1854	Charlotte Town	P. E. I.	50,000	100	5	Do.	3,000	3 50	....	....	
1857	Cobourg	C. W.	30,000	—	-	February & August.	4,000		....	....	
	Dundas	C. W.	30,000	—	—	Do.	6,000	4 00	....	....	
	Frederick	N. B.	50,000	—	—	Do.			....	....	
1843	Halifax	N. S.	160,000	40	7	May.	30,000	3 00	....	....	
1850	Hamilton	C. W.	125,000	40	5	March & September.	20,000	3 50	....	....	
1848	Kingston	C. W.	80,000	100	—	Do.	6,000	3 50	....	....	
1858	London	C. W.	100,000	20	5	May & November.	5,000	5 00	....	....	
1847	Montreal	C. E.	400,000	40	—	March & September.	110,000	2 80	....	118	Last sale at this figure.
1854	Ottawa	C. W.	40,000	40	5	Do.	5,000	4 50	....	....	
1859	Point Levi	C. E.	25,000	25	—	January & July.	4,000	3 50	....	....	
1859	Port Hope	C. W.	28,000	20	4	May & November.	4,500	3 50	....	....	
1847	Quebec	C. E.	200,000	200	4	January & July.	60,000	3 00	....	....	
1848	Saint Catherine's	C. W.	80,000	20	—	May & November.	7,000	4 50	....	....	
1859	Saint Hyacinthe	C. E.	15,000	20	—	Do.	4,000	4 00	....	....	
	Saint John	N. B.	170,000	85	—	June & December.	25,000	3 50	110	110	Sales at this figure.
	Saint John's	N. F.	50,000	—	4	Do.	30,000		....	....	
1858	Sorel	C. E.	14,000	20	4	Do.	4,000	3 00	....	....	
1848	Toronto	C. W.	400,000	100	4	February & August.	50,000	3 33½	....	....	

GAS-LIGHT COMPANIES IN CUBA, MEXICO, SOUTH AMERICA AND NEW ZEALAND.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
	Callao	Chile.		—	—	January & July.	20,000	7 00	....	....	
	Cardenas	Cuba.	50,000	—	—	Do.	180,000	5 00	....	....	
1857	Compania Cubana	Hav'a.	500,000	500	10	Do.			....	....	
	Cienfugos	Cuba.		—	—	Do.	12,000	5 00	....	....	These four towns are lighted by the Compania Cubana of Havana.
	Guanabacoa	Cuba.		—	—	Do.	14,000	5 50	....	....	
	Regla	Cuba.		—	—	Do.	10,000	5 00	....	....	
	Trinidad	Cuba.		—	—	Do.	16,000	5 00	....	....	
	Guyaquil	S. A.	150,000	—	—	Do.	35,000		....	....	
	Havana	Cuba.	1,250,000	500	7½	Do.	300,000	5 00	....	....	
	Lima	Peru.	100,000	—	—	Do.	150,000		....	....	
	Maranham (Chartered)			—	—	Do.			....	....	
	Matanzas	Cuba.	50,000	—	—	Do.	180,000	8 50	....	....	
	Mexico City	Mex.	550,000	—	—	Do.			....	....	
	Montevirdo	S. A.	500,000	—	—	Do.			....	....	
	Para (Chartered)			—	—	Do.			....	....	
1854	Rio de Janeiro	S. A.	1,000,000	500	7½	Do.	800,000	4 00	....	....	
	San Iago	Chile.	500,000	—	—	Do.	180,000	7 00	....	....	
1857	Saint Jago de Cuba	Cuba.	450,000	500	—	Do.	25,000	5 00	....	....	
	Valparaiso	Chile.	500,000	—	—	Do.	85,000	6 00	....	....	
	Vera Cruz	Mex	500,000	—	—	Do.			....	....	
	Ville Clara	Cuba.	50,000	—	—	Do			....	....	
	Auckland	N. Z.		—	—	Do.			....	....	

THE ELECTRIC LIGHT AT BOSTON.

PHOTOMETRICAL POWERS OF THE LIGHT.*

I send you a short account of my observations on the power of the electric light exhibited with such striking effect by Mr. Ritchie, on the evening of the 6th inst., (the National "Thanksgiving"), in this city. Through his kindness, I was enabled to make a more satisfactory measurement of the illuminating force of the battery at the State House, than I had the means of doing on the occasion of its former exhibition on the 4th of July.

The battery in question, consisting of 250 Bunsen elements, having each an acting zinc surface of about 85 inches, and grouped in five battallions of 50 each, was arranged in the dome of the State House, and the carbon light and the photometric apparatus prepared for the purpose were placed in line across the same apartment, commanding a range of about fifty feet.

In view of the immense power of the light, as observed in the previous experiment, I substituted for the 20-candle gas-burner, used at that time as the standard of comparison, a unit ten times as great, formed by the flame of a kerosene lamp placed in the focus of a small parabolic reflector, and throwing its concentrated light on a potometric screen of prepared paper fixed in front of it, at the distance of five feet. Before the observation, the lamp and reflector were so adjusted as to make the light cast on the near side of the screen equivalent by measure to the action of 200 candles.

This was done by the intervention of a kerosene lamp fitted up with a bridge of platinum wire for defining and restricting the height of the square flame. Such a lamp I find of frequent use in ordinary photometry, as, when suitably adjusted, it gives the light of about eight standard candles, and thus transfers the measurement in the photometer to the wider divisions of the scale. Being suspended in a balance of peculiar construction, its rate of consumption enables us to correct for any slight departure from the assigned illumination. The lamp thus regulated was placed with its flat flame 12 inches from the screen, while the lamp in the reflector was distant 60 inches, and the flame of the latter was adjusted until the effects on the screen were equalized.

A platform supporting the standard lamp and screen at the assigned distance was arranged to slide on a horizontal graduated bar, extending directly towards the carbon points so that the screen should receive the rays from the electric light and from the reflector perpendicularly on its opposite faces. In making the observations, the platform was moved to and fro until the illumination on the opposite sides of the screen was judged to be equal, and then the measured distances of the two antagonizing lights from the screen gave, by easy computation, their relative illuminating power.

By a series of such observations, it was found that the carbon light had a force varying from 52 to 61 times that of the lamp with reflector, making it equivalent in illuminating power to the action of from 10,000 to 12,000 standard sperm candles pouring their light from the same distance upon the surface of the screen. This, it will be remembered, is the effect of the unaided carbon light sending its rays equally in all directions from the luminous centre, and falls vastly short of the illuminating force of the cone of collecting rays which was seen stretching like the tail of a comet from the surface of the great reflector. Judging from some recent experiments on the power of such a reflector to augment the intensity of the light emanating from its focus, there can be no doubt that, along the axes of the cone when brought to its narrowest limits, the illuminating force of the carbon light, as displayed on the State House, could be rivalled only by that of several millions of candles shining unitedly along the same line.

In the above described observations a thick screen was necessary on account of the great intensity of the lights to be antagonized. I need hardly say that the different color of the two lights added much to the difficulty of the measurements. But, by marking in each case the extreme limits on either side, it was practicable to adjust the screen pretty accurately to equality of illumination.

* In a letter to Prof. B. Silliman, Jr., from Prof. William B. Rogers, dated Boston, August 14th, 1863.

The only previous experiment of precisely the same kind which I can recall is that of Bunsen, cited in the books, which was made with a battery of 48 elements. In this the photometric equivalent of the carbon light was estimated at 572 candles, or nearly 12 candles to the cell. My observations show a power more than three times as great, or about 40 candles to the cell, a difference due, no doubt, largely to the more intensive battery at my disposal and the cumulative effect of its arrangement. I suspect, too, that the elements in Bunsen's observation were of inferior size, but on this point I am without definite information.—*Silliman's Journal.*

ON DESTRUCTIVE DISTILLATION, CONSIDERED IN REFERENCE TO MODERN INDUSTRIAL ARTS.

BY B. H. PAUL, PH.D.

(*Continued from page* 76.)

In speaking of the practical applications of the products of destructive distillation, I must not omit to mention the patent obtained by Mr. Mansfield, in 1847, for "An improvement in the manufacture and purification of spirituous substances and oils, applicable to the puposes of artificial light, and various useful arts, and in the application thereof to such purposes, and in the construction of lamps and burners applicable to the combustion of such substances." This is described in the specification to consist—

1st. In methods of separating the oils and spirituous substances contained in tar or oils distilled from any kind of coal, either in the manufacture of gas, or by any other process of destructive distillation of coal.

2d. In methods of purifying volatile bituminous oils found native, or produced by destructive distillation.

3d. An improved application of the products thus obtained and purified, to the purposes of artificial illumination, by reducing the proportion of carbon in the flame produced by burning them.

The method adopted by Mr. Mansfield for separating the constituents of tar, was to collect, in fractional portions, the oil distilled off at different temperatures. The purification of the products thus obtained was to be effected much in the same manner as that described by De Saussure, by Reichenbach, and in the specifications already mentioned. The reduction of the proportion of carbon in the flame of the oils from the tar, was effected either by mixing them with other combustible liquids containing a smaller amount of carbon and more oxygen, or by mixing them with a gas containing less carbon, or none at all, such as carbonic oxide, or atmospheric air. For this latter purpose the most volatile portions of the oils obtained from tar were employed.

Further attempts were made in this country to work the bituminous shale of Kimmeridge and Wareham, and also to manufacture oil from peat, under a patent obtained by M. Reece in 1848, but no results of any advantageous nature were obtained in either case.

The cause of these failures to establish in this country the manufacture of the products which had been found profitable on the Continent, was twofold. In the first place the general introduction of gas-lighting limited the possible demand there might otherwise have been for an improved illuminating material; and, in the second place, the materials operated upon yielded the oil in such small proportion, and, frequently, of such an offensive character, that it was found impossible to introduce it into use for lamps, or to manufacture it profitably for other purposes.

But, on the Continent, the oil yielding materials worked there, though not much more productive than those in this country, furnished oil of a less objectionable character, and more easily purified. Moreover, as gas was little used, there was a wider field for the introduction of this oil as an illuminating material. It rapidly came into use, and several manufactories were established for its production in various parts of Germany. It was there that the manufacture was perfected, and that the demand for these products of distillation was first established.

The next step in order of time was in the year 1850, when a patent was obtained by Mr. W. B. Stones for "Improvements in treating peat and other carbonaceous and ligneous matters so as to obtain products therefrom." These improvements are described in the specification to consist in distilling "shale, stone-coal, cannel coal, and other coals, petroleum, asphaltum, &c.," so as to extract from them oil and paraffin, and in methods of separating and purifying these substances. The distillation was to be effected in closed vessels, not heated externally, but by means of steam heated to a sufficient temperature to carry off the products in a state of vapor. Shortly afterwards, in the same year, a patent was obtained by Mr. James Young, for "Improvements in the treatment of certain bituminous mineral substances, and in obtaining paraffin there from." These improvements are described in the specification to consist in gradually heating the coal up to a low red heat, at which it is to be kept until volatile products cease to come off, care being taken to keep the temperature from rising above that of a low red heat, to prevent as much as possible the desired products of the process being converted into permanent gas. The product so obtained was described as oil containing paraffin, and was hence called paraffin oil. Methods of separating this product into various useful commodities, and of purifying them, were also described in the specification.

In the Exhibition of 1851, specimens of paraffin and other products obtained by the distillation of peat, shale, coal, and bitumen, were exhibited, and in the Jury Report it is stated that "the condensible products from the distillation of coal and other bituminous products are becoming every day more important," the value of these products for lubricating purposes being especially pointed out.

At that time the only hydrocarbon oil used in this country as an illuminating material was camphine—a very highly refined spirit of turpentine. Though the hydrocarbon oils obtained by destructive distillation were largely used on the Continent for burning in lamps, they had not come into use for that purpose here, and were not so used until several years afterwards. But success had been attained in the application of hydrocarbon oils from another source and in a different direction. The intimate connection and similarity between the oily products of destructive distillation, and mineral oils, such as petroleum, found in many places, had long been recognized in a general way, and was described in most chemical works.

Dr. Christison had shown that this resemblance extended beyond the mere outward character of these materials by the extraction of paraffin and various oils from the petroleum of Rangoon, and various other chemists had added to the knowledge of these native oils. In 1847, about the time Mansfield's patent was taken out, petroleum was discovered in a coal mine in Derbyshire, and Dr. Lyon Playfair drew the attention of Mr. James Young to it, the consequence of which was that he took a lease of the petroleum spring in conjunction with Mr. Meldum, and established a manufacture of lubricating oil from this material. This was the first successful application in this country of hydrocarbon oils, and the first instance of the realization in this country of Reichenbach's prediction that these materials would become useful as soon as they could be obtained in adequate quantities, and at a sufficiently low cost.

(*To be continued.*)

A GIGANTIC BALLOON.—The London *Mechanics' Magazine* says:

It is announced that an Anglo-French company is formed to provide the amount necessary for the construction of a gigantic balloon, on a system invented by a M. Nadar, capable of raising 80 persons in a car two storys high, which will contain provisions and other necessaries, including, it is said a printing-press. The diameter of the balloon is to be equal to three-fourths the height of the towers of Notre Dame. 12,000 yards of white silk have been supplied by a Lyons manufacturer, at 7 f. the yard. This monster balloon is to be inaugurated next month at the races of Baden-Baden. Subscribers for the trip have already set down their names. It is to last eight days and eight nights. After having made a trip across the Channel and another in the Mediterranean, the company at whose expense the balloon is to be constructed will exhibit it in London, Paris, and New York. The produce of the exhibitions is to be employed in the construction of a definitive aerial locomotive.

PETROLEUM ITEMS.

The Alleged Petroleum Nuisance at Liverpool, England.—At the weekly meeting of the Liverpool Health Committee, held on Thursday, July 30th, Dr. Trench, the Medical Officer of Health, presented his official report on the petroleum question as follows:

"The Medical Officer of Health reports on two memorials against the continuance of petroleum stores in Cranmer street, addressed to the chairman and members of the Health Committee, and signed by 358 residents of the neighborhood. Also on the complaint of Mr. Joseph Hobson, a proprietor of houses in Cranmer street. Also on letters addressed to the chairman of Committee by Mr. Wm. Vernon, of Goree street, and by Mr. James Johnson, surgeon, of Kirkdale, that he visited and inspected the said stores of petroleum on the 20th, 22d, 23d, 24th and 25th instant, and spent, on an average, three hours daily in the neighborhood, investigating into the correctness of the allegations of the complainants. He found the petroleum, consisting principally of crude Canadian, warehoused in the large airy room of a substantially-erected brick-built shed on the north side of Cranmer street. There were evident indications on the floor of leakage from the casks, and the spilling of the oil, inseparable, probably, from the necessary manipulations of coopering, guaging, and refilling the casks. The offensive smell of the oil was very strong in the adjacent streets, and very perceptible in the front rooms of many of the houses which he examined. He has therefore no hesitation, from his own observations, and from the testimony of the residents of the neighborhood, in declaring that the said stores of petroleum are a nuisance.

"But in order to bring the question of their compulsory removal within the official cognizance of the Medical Officer of Health, it is required by the provisions of the Local Sanitary Act, that the nuisance shall be one prejudicial to health, since the Council or your Committee cannot direct complaint to be made before a justice of the peace until it be certified by the Medical Officer of Health that it is, in the words of the Act, 'a nuisance, and prejudcial to health.'

"The Medical Officer of Health reports that in order to obtain evidence of its effects on health he visited every house in Cranmer street, eighteen houses on the north end of Latimer street, immediately opposite the stores, all the houses in Llewellyn street and Tindall street, every street running parallel to Cranmer street, and four of the best houses in that part of Boundary street being opposite the back of the stores—that in this investigation he visited and took evidence on the health of the inhabitants of 153 houses, comprising a resident population of 852 souls, and that he could not satisfy himself that in any case it had been, or had produced effects prejudicial to health; that there were in this number four asthmatics who complained that the smell of the oil aggravated their sufferings; but as in that disease the slightest change in the force of the wind, or in the thermometrical, electrical, or hygrometrical condition of the atmosphere is sufficient frequently to excite a paroxysm, it would be perfectly useless to rest a complaint before the justices on such cases.

"In 137 of the houses examined there were no cases of sickness or debility, and of the remaining 16 houses the sick were individual cases of disease, generally of long standing, antecedent to the establishment of the stores, and in no way dependent on the effect of petroleum.

"The Medical Officer of Health particularly observed the condition of the children and young people—first, as being more sensitive to the effects of noxious vapors; secondly, as being less likely to be sufferers from either intemperance or those anxieties of life which give to the countenance the aspect of disease. He never remembers to have seen in any district of the town so many healthy, ruddy-faced children, or more healthy-looking young people: and his impression of the peculiar healthfulness of the inhabitants of Cranmer street and Latimer street is confirmed by the weekly reports of the district medical officers, since No. 1 district, comprising these streets, is the most satisfactory in its sanitary condition of the whole twelve into which the town is subdivided.

"The Medical Officer of Health desires, by thus detailing the facts as they came before him, merely to illustrate to the committee the utter impossibility of his gratifying the wishes of the complainants, that he should certify against the petroleum stores in the terms of the Sanitary Act. He scarcely thinks it necessary to protest against any conclusion being drawn from his observations in favor of the absurd idea, so prevalent in Canada, that the smell of petroleum is prophylactic of disease, though there are errors more common in the sciences of medicine and political economy than those occasioned by reasoning on facts co-existent as if they were co-relative, or had together the relationship of cause and effect. The Medical Officer of Health is aware that probably by the spirit, if not by the letter, of the 27th clause of the Nuisance Removal Act for England (1855), he could certify these petroleum stores as a nuisance, independently of their being prejudicial to health, but he considers that it would be useless to do so, as the power of the justices under that Act only extends to compel an offender to use the best practicable means of preventing or counteracting effluvia—a point towards of the solution of which, in the instance of petroleum, no practical suggestions have hitherto been made by chemical or mechanical science."

Mr. Stitt expressed his belief that the nuisance was one that could be dealt with in the ordinary course in the courts of law.

The Chairman said the Medical Officer reported that the effluvia was not prejudicial to health. The Health Committee had to deal with the public health, and not merely with offensive odors.

Mr. Crellin said there were casks that could be used, and which would effectually prevent the nuisance.

Mr. Steel said that at the South End one petroleum nuisance had been suppressed by the use of better casks.

The Chairman said there was no doubt the smell was much increased by the slovenly manner in which the petroleum was manipulated.

The Canada Oil Business.—A recent number of the Oil Springs *Chronicle* says:

The mining or producing and the manufacturing branches of the oil business have at length, by the inevitable law of commerce, assumed their proper positions in relation to each other, although the proper position of the result of these industrial branches combined has not yet been recognized to the extent anything like commensurate to its merits or value. With crude oil at $5 per barrel, the refined may be sold at 40 cents per gallon, without loss, but with very little profit—if, indeed, any—taking into consideration the great "wear and tear" of the machinery, etc., employed. But, aside from this, the risk involved is greater than in most other kinds of business, and it is our opinion that no one is warranted in investing in a refinery or in sinking wells without a pretty fair prospect of at least a 200 per cent. dividend every season. This view may seem extravagant, but we defy an instance where an individual or firm has made any considerable amount of money here so far, while we can point to dozens of instances where, in some cases, hundreds, and in others thousands, of dollars have been expended without a dollar ever having been returned. The price of crude oil is not likely to go below $5 per barrel before February next, and refined may be expected to rule from 50 cts. per gallon upwards, as the principal part of the oil now on hand is held by able parties, who will be unwilling to part with it without realizing a fair profit. When the retail tradesman will pay 95 cts. per gallon by the barrel for the oil, and can afford to sell it to his customers by the single gallon at $1, then will the business flourish; then will the tradesman receive a fair remuneration, and then will the consumer appreciate the beauties and economy of his "coal-oil lamp."

Limited Yield of the Canada Wells.—From the *Chronicle* we take the following figures, giving the yield of some of the wells in that region. Their supply of oil has sadly diminished, and what little is now obtained is pumped out:

The Shaw well is being pumped by steam, but the expectations of all in regard to its yield have been disappointed. It has not averaged 10 barrels per day so far.

The Duncan & Clark well, only a few rods distant from the Shaw well, yields 20 barrels.

The Solis (formerly Whipple) well has averaged over 11 barrels per day, since steam-power was applied.

The old Dumont well is now pumped, and is doing quite well, how much we are unable to say.

The Richardson & Rumsey well, pumped by hand or spring-pole, affords 8 barrels with a few hours pumping each day.

Mr. Alex. Miller is making rapid preparations to pump the two Campbell & Forsyth wells with an engine. It is thought these wells will yield well.

The Canada Rock Oil Co. well continues the same, yielding about 25 barrels.

From 3 to 5 barrels per day of oil are being taken from the Black & Matthison well, on the Bruce territory, by means of a small hand-pump.

The Oil Business.—The business has been more quiet for a few days, but prices remain firm. Crude is now selling at $6 at the wells, $7 at Oil City, $7 25 at Franklin, and $10 50 at Titusvill, packages included at this point. The quantity of oil at the wells is small. Many new wells are now being put down—in fact greater activity is now being manifested by miners than ever before. Old wells, which have been abandoned for months, are now being sunk deeper and tested in various ways. Pumping wells of five or six barrels per day are now considered paying institutions. The amount transported by the Oil Creek Railroad, during the month of August, was 42,814 barrels. Hauling to the depot is $1 50; prime barrels $3.

Pipe Laying.—A survey has been made and arrangements are being rapidly consummated by responsible parties for laying pipes from the Sherman well to the Miller farm, for the purpose of *forcing* oil, instead of hauling it, to the above named place, where the Oil Creek Railroad will take it.—*Petroleum Reporter.*

The Storage of Petroleum at Hamburg.—One of the immediate practical results of the important experiments on petroleum made last month at Hamburg by the authorities of that city is the publication of a decree of the senate, considerably relaxing the stringent measures hitherto in force with regard to warehousing petroleum in private stores. The decree ordains that crude petroleum, petroleum naphtha, and petroleum that evaporates into gas at a lower temperature than 30° Reaumur (99½° F.) must be, as heretofore, warehoused exclusively in the public stores on the island in the Elbe. Refined petroleum, however, from which no inflammable gases emanate at a temperature under 30° R. may, as in the case with oil of turpentine, be warehoused in the private stores of retailers to the extent of 1,600 lbs., and may be shipped without requiring the presence of a police guard. The quantity of refined petroleum allowed to be kept in a shop or other place of sale by retail is extended to 300 lbs. The private warehouses for storing refined petroleum must first be examined by the police, and found unexceptionable; they must have no vent towards the canals, streets, or courts, by which the liquid can escape, and the doors must be furnished with a sill at least six inches high. Importers and owners of refined petroleum are bound to submit samples of their goods to one of the local sworn chemists, who will analyze them, and furnish a certificate of the examination. All petroleum not accompanied by such a certificate will be considered inflammable and dangerous, and cannot be admitted into private warehouses, but must be sent to the public stores.

Petroleum for Preserving Wood.—The oil-wells near Prome, in Burmah, have been in use from time immemorial. Wood, both for ship-building and house-building, is invariably saturated or coated with the product of those wells. The result is entire immunity from decay the ravages of the white ants that, in that country, are so generally destructive. M. Crepin, a Belgian Government engineer, who has tried experiments upon the relative advantages of creosote and sulphate of copper for the preservation of timber in marine constructions from the attacks of worms, says, that creosoting is the only process he has found to succeed for this purpose. He states that sulphate of copper affords no protection whatever against the action of salt water and marine insects. The Belgian Government now requires that all the wood sleepers used in the State railroads should be creosoted; and the Government of Holland have also made the same resolution, and upwards of 300,000 sleepers per annum are now being creosoted by the Dutch Government, and more by the Belgian Government.

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Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and promote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, HEATING, and DRAINAGE everywhere.

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THE

AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

C. ELTON BUCK, ... EDITOR.

TUESDAY, SEPTEMBER 15, 1863.

The report of Mr. HAYWOOD and Dr. LETHEBY to the Commissioners of Sewers of London, on the consumption of gas in the street lamps, which we published on page 71 of the last number of the JOURNAL, merits something more than a passing notice. Ever since the process of carburation has been tried in the public lamps, the prejudices of those who habitually oppose any innovation, were at once aroused, and denunciations without number followed. Some of the gas-engineers of the *ancient regime*, conceiving a holy horror of the bare idea of attempting to improve the gas which they made and which they considered the very perfection of gas, evinced great indignation when a portion of the street lamps of London were to be set apart for trying the process of carburation. The apprehensions of these timid gentlemen were echoed by our respected progenitor the *Journal of Gas-Lighting*, which seems incapable of conceiving an original idea, and which has lost no opportunity for flinging opprobious epithets at the whole design. We have occasionally published the opinions of the *Journal* on this subject, in which a persistent opposition to the scheme of increasing the light by carburation is manifest, and a deliberate purpose shown of ignoring any possible good which may result, and of dwelling with particular emphasis on any irregularities or deficiencies which may have been noticed.

We have opposed the design of carburating gas within doors as being dangerous, and because the carburetting apparatus within private residences or public buildings would be liable to be meddled with by servants and others not knowing anything of the peculiar properties of the substances employed. Frequent explosions have resulted from this cause, and even persons accustomed to the manipulation of dangerous substances have been killed, as was MANSFIELD by the explosion of a carburator which he had patented in 1847. The carburation of street lamps would be attended with very little danger. They would be entirely under the control of the proper authorities, and their isolated position would render them for less liable to be productive of danger, even should an accidental explosion ensue.

We do not deem the report of Mr. HAYWOOD and Dr. LETHEBY to be by any means conclusive as to the superiority of carburetted gas, although it presents the subject in a light so favorable as to merit a continuance of the process for further trial. Their conclusion, that the lamps with carburators consuming only 3 cubic feet of gas per hour gave 25 per cent. more light than those consuming 5 cubic feet, certainly shows a very great increase, but a very important subject is passed over in the report, and not even an allusion is made to it. This question, which is important above all others—the question of comparative cost—is entirely ignored. Why is this? Is it because this aspect of the case will not bear a close scrutiny? Before pronouncing on the success or failure of carburetted gas, the question of relative expense must be thoroughly understood. The lamps may yield 25 or even 50 per cent. more light, and yet the cost of obtaining this increase may be greater in proportion than the facts of the case would warrant. But as the report seems to have been made with reference to particular subjects, in which the question of cost did not enter, perhaps it is as complete as the occasion would seem to justify, and so far as it goes its inferences are decidedly in favor of the carburation process.

One suggestion which is briefly mentioned at the close of the report, we heartily concur in. We refer to the supply of gas to public lamps by meter. So long as the street lamps are supplied in the present crude and unsatisfactory manner, just so long will there be an occasion for the disputes and contentions which so frequently occur. The contract system is behind the age, and is open to many serious objections; and until a more rational method of disposing of gas to public lamps be adopted, we may expect to witness quarrels and disputes between gas companies and municipal authorities, and to experience the discomforts of badly lighted streets. Let any one take an evening stroll through the streets of New York, and observe the wretched manner in which they are lighted. The burners in the street lamps are nominally 3-feet burners, yet who has any idea that anything like that quantity is, on an average, consumed in the public lamps? We could mention some of these burners, which give no more light than a single tallow candle, and this not for one night only, when the deficiency might be attributed to a temporary obstruction of the burner, but for weeks at a time. If gas were sold to the city by meter, at a fairly remunerative price, we warrant that the burners would be opened and kept open to their full capacity, and that the lamp-lighters would have no orders to turn down the taps until the burner ceases blowing, and no temporary pressure would be put on the holders for the purpose of producing this blowing.

J. O. N. RUTTER, Esq., of Black Rock, Brighton, England, who is widely known as a writer on gas, in a pamphlet "On the Sale of Gas," takes decided ground in favor of the adoption of meters for public lamps. Mr. RUTTER's remarks are so sensible that a quotation will be appreciated by our readers. Referring to the contract system, he says:

"The gas company has agreed to sell, and the public authorities have agreed to buy, say, five cubic feet per hour, in so many lamps, for a certain number of hours per night, varying according to the seasonal increase and diminution of light and darkness.

"All this looks very plain and easy, and intelligible. How is the quantity of gas to each lamp to be measured? By the eyes and hands of the lamp-lighter, who has to make such an adjustment at the stop-cock, as by experience he knows will be sufficient for the proper supply of the burner until he goes to it again in the morning!

"Is such an adjustment practicable, so as to be in exact conformity with the terms of the contract? No. Gas companies know that it is utterly impossible, and the public authorities know equally well that it is utterly impossible, to insure a uniform supply of gas to one-tenth part of the street lamps during the whole period between lighting and putting them out. This was known to all the parties concerned in the contract before it was entered into. It is one of the laws which we are unable to alter, that gas of a given quality, (specific gravity,) will pass in equal quantities during equal periods of time through an aperture of a certain size, provided the pressure (force with which it is impelled) be uniform. If the rates of pressure be variable, the quantities of the gas will also be variable."

These are plain truths, plainly spoken, and they must carry conviction with them. They need no enlargement, for the assertions made cannot be controverted. They reveal the evils of the contract system in "all its naked deformity," and the wonder is that they have remained so long unheeded.

A number of consumers are of the opinion that gas-engineers oppose the introduction of meters to street lamps from motives of policy. This may be true in some instances, but we believe the larger number would gladly see the contract system abolished, and the sale of gas by measurement substituted. There are difficulties in the way of inaugurating such a reform, it is true; and then some one is needed to break through the trammels of present customs, and set the example. Imaginary troubles are anticipated, and obstacles are looked for, which will be found to exist only in the fancy of those who indulge them. Referring to the objections which have been urged against meters on public lamps, Mr. RUTTER says:

"As respects a separate meter for each lamp, its cost, its adoption, its accessibility, and its security—these are matters which present only imaginary difficulties. If the difficulties were real, and greatly multiplied, they would be trifles in comparison with those which had to be grappled with when meters first began to be generally used by consumers of gas.

"The meters employed in supplying gas to street lamps, will have an advantage over those in use in private houses. They will work more uniformly, with fewer and shorter periods of interruption, and will, therefore, be likely to be more durable. All meters sustain greater injury by long and irregular intervals of rest than by keeping steadily at their work."

Mr. RUTTER's long experience qualifies him to write understandingly on this subject. His arguments are unanswerable, and their force is so apparent that the wonder is that they have been so little heeded. Fortunately, a beginning has been made in London, where the lamps in the Great Central Gas Company's district are supplied with meters. We hope the benefits arising from this experiment—for this is all we can call it at present—will be extended, and that ere long the custom may become universal. The sale of gas by meter is the only equitable method in which it can be disposed of, and this remark applies quite as much to the supply for public lamps as to that destined for private consumers.

ANSWERS TO CORRESPONDENTS.

C. A. B., of Wis.—*We will procure the work if possible and send it by mail. If it cannot be obtained in this city it will have to be imported, and this will take about two months.*

F. C. T., of Del.—*We shall be pleased to hear the results of your investigation. The field you have entered is a wide one, and we think it will repay you for your exertions in exploring it.*

J. S., of Pa.—*So far as we know there are but four municipal gas works in the United States. These are Philadelphia, Pa., Frankfort, Ky., Richmond, Va., and Alexandria, Va. We do not see that consumers in these places are any better off than in towns where private corporations own the gas-works.*

S. H. B., of N. Y.—*Several reasons were given, but none of them were satisfactory. We do not know what course will now be pursued, but a compromise will be most likely effected.*

E. F. E, of Ohio.—*Your letter arrived safely, but the package has not been heard from. When it arrives we will inform you of our opinion by mail.*

H. D. M., of C. W.—*Your idea is certainly novel, and appears to be feasible. We hope you will be more successful than a countryman of yours whom we could name, and who vainly attempted to accomplish what you are aiming at. You seem to have commenced by paying some attention to the philosophy of the operation, which he did not. The apparatus may be bought in this city, and the expense will not be very great.*

GAS IN FRANCE.—The gas at the Grand Hotel in Paris costs annually $26,000, or precisely what the lighting costs of the whole town of Orleans, a city by no means badly lighted.

The small town d'Enghein, near Paris, numbering scarcely a thousand inhabitants, is about to be lighted with gas.

FINANCIAL.

Monday Evening, September 14th, 1863.

We have to report another very quiet fortnight as regards dealings in gas-light shares. The same cannot be said, however, with respect to transactions in other stocks, for since our last issue the market has experienced a very convulsive throe, and a monetary panic has ensued among the frequenters of the Stock Exchange, in which a number of operators found themselves very unexpectedly in a tight place. The daily papers have informed the public of the particulars of this temporary excitement, and as gas shares were not at all influenced by the collapse of prices, we will not take the space to make more than a passing allusion to it.

We notice that on to-morrow, the 15th inst., quite a large amount of *Manhattan*, N. Y., shares and scrip is to be sold by auction at the Merchants' Exchange salesroom. One hundred shares of *Metropolitan*, N. Y., are also to be included in this sale, which is made by order of the executor of the estate of the late Anson G. Phelps.

Among gas-shares now offered for sale we notice a small parcel of *Batavia*, N. Y. This company are in a very flourishing condition. Their capital is small, their works are in good condition, their consumption is increasing, and they have always paid dividends at the rate of 8 per cent. per annum from the start. We have been told that, in addition to the regular semi-annual dividend of 4 per cent., declared last July, the company earned a handsome surplus, which they have reserved. Batavia is the county town of Genesee County, and is the centre of quite a flourishing trade.

There is very little movement in other gas-shares, and, as we remarked in our last notice of financial matters, we shall look for very few transactions until the close of the present month.

THE PETROLEUM QUESTION.

The Canadian journals continue to discuss the aspects of the petroleum traffic in that province, with a degree of seriousness which shows the importance of the issues involved. A crisis in the oil trade in Canada seems at hand—or rather it has already been reached, and its effects have been shown by the remarkable advance in price, to which we alluded in our last issue. From various parts of the oil region we hear of the failure of well known wells, and as but few new ones are discovered to replace them, the market must necessarily be denuded of Canada oil. This result will have a deadening effect upon the prosperity of those towns and villages, which have sprung up as if by magic in the midst of the oil wells, and unless some new and unforeseen results should ensue, we fear that the prosperous days of these young settlements will soon be numbered, and that the period of their decadence is not far distant.

Those who have never visited the oil regions can form but a very limited idea of the magnitude of the business depending directly and indirectly upon the continuance of the supply of oil. The machinery for pumping and for boring the wells, the barrels, the chemicals necessary for purifying the oil, the labor, the professional skill in superintending the operation of refining, together with the branches of business more remotely depending upon the trade, when translated into dollars and cents, amount to a sum which would astonish the uninitiated. A blow struck at interests of such large proportions, must be severely felt, and cannot but inflict disappointment and loss on many of the parties involved in the consequences of the non-productiveness of the wells.

The Toronto *Globe* has the following comments on the subject:

There is no longer any reason to doubt that the supply of crude petroleum is running short. We have always been inclined to set down the reports of the stoppage of wells as due to the imaginations of interested parties, but the fact is now undoubted that refineries in the immediate neighborhood of the Enniskillen wells are stopped for want of the raw material; that instead of over a hundred teams plying on the road to Wyoming, there are now not ten; that the entire yield of the wells is estimated as low as a hundred barrels a day, and that the price has risen in consequence from 15 cents a barrel, which was paid about this time last year, to $5. There seems to have been a rather sudden exhaustion of the great reservoir of oil which was first tapped by the Shaw flowing well. Some of the best wells are now perfectly dry, others yield by pumping from 3 to 15 barrels a day, and only one produces as much as 80.

This is a gloomy view of the case. The *Globe*, however, hopes for the best, and says that deeper borings are being made, and adds that—"salt water has been found in considerable quantities, and will probably prove a source of profit in places where the oil has failed." We fear this flattering unction will not be realized. If oil cannot be found, we think salt will prove a poor substitute, and one that can never create that demand for the many articles necessary for prosecuting the oil business.

The Oil Springs *Chronicle* has been estimating the probable Canadian demand for petroleum for illuminating purposes. We quote as follows:

It is estimated that at least two-thirds of the total inhabitants of the Province are consumers, the last census showing a population unitedly (Upper and Lower Canada) of 2,506,755, or to deal in round numbers, say two-and-a-half millions; but for those who do not use petroleum deduct one-third, which will leave for those who do use it 1,666,666 persons, or, dividing by five, the number allowed to each family, we shall have 333,333 families, averaging not less than ten gallons each for the year. What have we now for the consumption of refined petroleum in Canada the present season? Upwards of 83,000 barrels; and it must be acknowledged the bases of the calculation are within bounds, if not too limited even. No allowance, it will be observed, has been made for the hundreds of hotels, stores, offices, shops, factories, churches, railway stations, and in some places the streets, &c., &c., *ad infinitum* almost, which are lighted by the enterprise of Enniskillen.

But the demand or quantity consumed will have no influencing effect on the market if the supply is ample. Let us see, then, what the disparity between the supply and the demand is, and what effect it will have.

It has been pretty definitey ascertained that the gross amount of refined oil now in Canada in hands of refiners and dealers does not exceed 15,000 barrels, and the daily yield of crude oil at the wells is now only 200 barrels, which, if all manufactured in the Province, would yield 50 per cent. of burning oil to be added daily to the 15,000 barrels already on hand, making, up to the 1st of December—after which date very little oil will be made before the following summer—say 8,000 barrels more, or to be liberal, 10,000; making in all only 25,000 barrels to meet a demand for at least 50,000 barrels which will be required from this time up to April—the oil-burning season.

The inference from this is, that unless some unexpected addition to the supply is discovered, prices must rule higher than ever before, and that importations from this country may be necessary. In this event, the burthen of supplying the hitherto consumers of Canada oil, will be thrown upon the Pennsylvania oil region, and this increased draft upon the resources of the petroleum of the United States will cause prices to advance much higher than they now are, and one great argument in favor of kerosene oils—indeed the main argument, that of economy—will be somewhat weakened. Unless some new accessions to the supply are met with, we cannot see but that prices of refined illuminating oil must advance to such figures as to almost render the preparation of veritable coal oil remunerative, and an unexpected demand may thus be created for the Albert and other highly bituminous coals.

At all events, the people must have artificial light—cheap, free from trouble, and economical—and if it prove that refined oils advance to their old prices, a great number of consumers will be driven to the use of gas, and, as we mentioned when treating of this subject in our last number, gas companies, particularly those in Canada, will be freed from the depressing effects of the competition of the petroleum oils, which have brought many of them to a very unenviable condition.

VALUE OF LONDON SEWAGE.

Baron Liebig, the celebrated chemist, has recently written a letter referring to the value of the sewage of London, from which we take the following extract:

From exact calculation of the liquid and solid voidings of London, (the detail of which would be out of place here,) we may conclude that 42 tons of ammonia, 10 tons of phosphoric acid, and 7½ tons of potash find their way into the London sewers daily. These 42 tons of ammonia are contained in 247 tons of guano, the 10 tons of phosphoric acid in 83.3 tons of guano; thus 163.7 tons remain in which the phosphoric acid is wanting; or, what is the same thing, if, to the sewage obtained daily from London 100 tons of superphosphate of lime (at 20 per cent. of phosphoric acid) be added, the value of the daily voidings of the metropolitan, or the sewage of London, is made equivalent to 247 tons Peruvian guano; or, by the addition yearly of 36,500 tons of superphosphate, we may acquire the value of 90,155 tons guano, at £13 12s. 6d. = £1,228,364. Deduct the price of 36,500 tons of superphosphate at £5 5s. = £191,628, and we have £1,036,736 as the money value of the sewage. To this should still be added the worth of potash in the sewage water. Potash is the manure which the farmer obtains with the most difficulty; it is that element, too, which renders his stable dung (the amount of phosphoric acid and ammonia being the same) of greater value and efficacy. In 247 tons of guano, about 1½ tons of potash are contained; but every day 7½ tons are obtained in the sewer water, which gives a surplus of 6 tons, corresponding to 11 tons of sulphate of potash, giving yearly 4,015 tons, which at £18 per ton, shows a money value of £72,270. Add this to the sum above given, and we have as real annual money value of the London sewage, £1,109,006.

Gas-Fitters' Work.—The following letter signed "a gas inspector" we take from the London *Builder:*

"You once did me the favor of inserting a few lines about gas-piping as laid into houses by the builders in the course of erection of the houses, the work in question being generally done by some half-and-half workman, as much a carpenter or smith as a gas-fitter, and not much of either. Well, now, I have to grumble at the regular full-blown gas-fitter, all complete with his shop and light cart, and his men with proper tools, (not forgetting white lead, that very good friend of the gas-fitter.) A consumer complains of an escape of gas near the meter. On investigation, my man finds a hole in the back of the meter, a dry one, caused by—what does the reader think?—by a spike used for supporting the meter in the next house having been driven through the 4-inch wall, the division wall of a house let at a rental of about £30. So much for the wall. And how much for the risk of fire? and how could the fire have been traced to its course, the meter of course having been burnt in the first onset? And is it not an aggravating thing for an insurance office manager to know this may be occurring any time? This sort of accident has occurreed in my own experience with a different result; inasmuch as it was a water tank (of wood, lined with zinc) that suffered; and the level of the water therein was lowered about 6 inches, producing a damp wall and flooing for a few weeks—and nothing worse.

New Invention in Burning Oils.—A patent has been granted, in England, to Rudolph Schomburg and Adolph Baldamus, for "improvements applicable to all kinds of oils used for illuminating purposes, whereby combustion thereof is rendered more perfect, smoke prevented, and the purity of the light increased." This invention consists in leading the vapor from water to all kinds of oils while burning in lamps; whereby it is claimed combustion is rendered more perfect. The lamp is so constructed that water is vaporized by the heat of the flame, which water is contained in a hollow cone or conical chamber around the wick-tube, whence it issues in vapor in contact with the flame about or above the point of its generation. The water vessel is, by preference, surrounded by another vessel or chamber, between which a passage is formed, through which air passes to the flame.

ON THE CONSTANTS OF GAS ENGINEERING.

(*From the Sanitary Reporter.*)

(Continued from page 75.)

In the Gas-Works Clauses Act, 1847, and in most of the special Acts relating to gas companies, Parliament has prescribed the maximum profits which gas companies shall be entitled to divide upon their capital, and has regulated the circumstances and conditions under which the price of gas is to be reduced when the maximum profit is attained. Provision is also made in the general act for the deposit of accounts by gas companies, and for the inspection and audit of these accounts on the part of gas consumers. Again, in the Metropolis Gas Act, 1860, it is provided that accounts are to be deposited in a form which has been settled and prescribed by the Secretary of State.

Notwithstanding all the paternal care which has thus been exercised by the legislature in order to secure for the public a reduction of price when the prescribed dividend has been reached, there are still many difficulties in clearly distinguishing whether the accounts have been properly prepared, and whether particular items are not sometimes erroneously placed to revenue account which belong in fact to capital, and are really extensions of and additions to the works.

It is only by the aid of an intelligible and rational system of constants, expressing the relation of various results to each other in the operation of gas-works, that we can ever hope to detect anomalies and errors in accounts which are intended to be uniform, and to be kept for the public benefit. A few illustrations will render this proposition more clear.

If we have, for instance, in any gas-works the cost of coals per ton, the total sum expended for coals in a year, and the selling price of gas per 1,000 feet, we can estimate with tolerable accuracy what the gas rental of the company ought to be. All companies under similar conditions, with respect to the preceding items, ought to yield the same rental; and if they do not, the result must be sought for in defects of manufacture, in extraordinary leakage, or in other causes of a similar nature.

Take, for example, a group of companies like those supplying the metropolis, paying the same, or nearly the same, price for coals, and deriving a fixed and definite price for their gas; it is evident there ought to be a corresponding relation between the gas rentals derived by those companies; and any great anomalies or irregularities in this should awaken research, with the view of discovering the source of such anomalies or irregularities. The same remarks apply to the yield of residual products, the cost of all expenses exclusive of raw material, and finally to the profits derived as the result of all the operations, this profit being the final balance between the annual receipt and expenditure.

We shall thus, by the aid of constants, distinguish those companies which are working judiciously from those which are wasteful and extravagant; we shall discover frauds and errors in the accounts, and last, not least, we shall determine when the capital is disproportionate and excessive.

In the case of the companies supplying the Metropolis, most of whom make their gas from Newcastle coal, the most useful constant by which to compare both receipts and expenditure will probably be the unit of £100 laid out in the purchase of coals.

Taking the most simple case of a group of companies, all buying the same kind of coal at the same price, all making the same kind of gas, and all selling at the same rate, it is evident that the rental for each £100 expended in coal should be the same for all. The other important heads of receipt and expenditure, such as—1. The price realized for residual products. 2. The absolute cost of raw material, or the cost of the coal, less the products. 3. The cost of all other expenses exclusive of raw material; and lastly the profit, will all depend on situation, management, and a variety of minute details which will hereafter engage our attention.

Even where a group of companies use coal at different prices, and sell their gas at varying rates, it is still possible by the aid of constants to make a perfect comparison between them, if we first perform the preliminary operation of reducing the various heads of receipt and expenditure to one denomination, which may conveniently be taken as a certain fixed unit expended in coal.

We have already given some examples of the proportion between capital and annual tonnage of coal used in the manufacture of gas, and have now to add another case in which the capital is lower than any that have hitherto been considered. The accounts of the Plymouth and Stonehouse Company for the last year have just been issued, and it appears that the company with a capital of £57,000 has carbonized during the last year, 18,973 tons of coal, so that the capital is at the rate of only £4.08 per ton of coal.

We shall have more to say as to this company when we come to speak of the working expenses, and in the mean time will only observe, that with the cost of raw material somewhat exceeding that which prevails in the metropolis, the price of gas for the last two years has been only 3s. per 1,000 feet. At this low rate, the full dividends have been paid, and the directors have just announced their intention of reducing the price from Michaelmas next to 2s. 9d. per 1,000 feet.

ON THE ANNUAL WORKING EXPENSES OF GAS COMPANIES.

Before proceeding to investigate these, from the accounts of gas companies of the present day, it will be interesting to glance at two rival estimates which were brought prominently before the public fourteen years ago, when the Great Central Company was first established. It will be useful to compare these estimates, not only with each other, but with the expenses which are actually found to prevail in the present working of gas companies. One of these estimates was by Mr. Croll, to whom the people of this metropolis are immensely indebted for the bold and persevering advocacy with which he supported the introduction of cheap gas into the city of London. Not only was Mr. Croll an advocate and pioneer, but he was the first really to succeed in breaking up that giant monopoly of the gas companies which had burdened the metropolis for many years with a price which is now confessed to have been prohibitory, and opposed to the extension of gas-lighting. The other estimate is by Mr. Barlow, the editor of the *Journal of Gas-Lighting*, and supposed author of the lucubrations, which appear every second week in the pages of that luminary under the title of "Circular to Gas Companies."

In the following comparative estimates, each item has been reduced to its proper value per ton of coal, each of the parties being agreed as to the actual tonnage of coal.

Heads of Expenditure or Cost, exclusive of raw material.	Estimates per ton of coal for making 368 million ft. of gas annually, from 40,000 tons of coal.	
	By Mr. Croll.	By Mr. Barlow.
MANUFACTURE.	s.	s.
1. Labor	2.68	3.73
2. Wear and tear of retorts	1.53	1.94
3. Lime	.17	.25
4. Wear and tear of works and mains	1.53	1.54
Total for manufacture	5.91	7.46
DISTRIBUTION.		
5. Lighting and repairing public lamps	1.00	1.20
6. Collection and bad debts	.62	.92
7. Rates and taxes	.62	1.95
8. Law expenses	.15	25
9. Stationery and incidentals	.60	.60
10. Directors	1.00	1.00
11. Engineers, secretary, clerks, and inspectors	1.50	1.50
12. Maintenance of works	.83	1.37
13. Wear and tear of meters	.37	1.60
Total for distribution	6.69	10.39
Add manufacturing expenses	5.91	7.46
Total cost of gas making per ton of coal, exclusive of raw material	12.60	17.85

In the following comparison, the working expenses are so grouped and arranged as to contrast with the corresponding items in Hughes* analysis of the London gas companies' accounts.

	Croll.	Barlow.	Ave. of London Co's.	Actual working of Great Central Co. for 1861.
	s.	s.	s.	s.
Labor, wear and tear of retorts, and maintenance of works, (1, 2, 5, 12)	6.04	8.24	7.64	7.27
Purifying materials, (3)	.17	.25	.41	.38
Wear and tear of works and mains, (4)	1.53	1.54	1.20	2.68†
‡ Collection and bad debts, (6)	.62	.92	.43	.32
Rates and taxes, (7)	.62	1.95	.89	.65
Law expenses, (8)	.15	.25	.35	2.38†
Stationery, incidentals, (9)	.60	.60	.44	.66
Directors, (10)	1.00	1.00	.40	.56
Salaries, (11)	1.50	1.50	.78	.54
Wear and tear of meters, (13)	.37	1.60	.47	.27
Cost per ton of coal, exclusive of raw material	12.60	17.85	13.01	15.71

An examination of the last table shows how much more nearly Mr. Croll's estimate approached the actual working of the London companies than that of his opponent, Mr. Barlow. Thus, whilst all the companies worked during the last year for which authentic and detailed accounts have been published, at 13s. per ton of coal, Mr. Croll's estimate was only about 5d. per ton lower than this, whereas, Mr. Barlow's was nearly 50 per cent. in excess. So much for those who strove to oppose the progress of gas-lighting by supporting monopoly and high prices. I do not so much complain of Mr. Barlow for making so erroneous an estimate. This, no doubt, was honestly enough done at the time—in fact, at that time he knew no better, and probably few people, except Mr. Croll and those of his own immediate school, did *then* know better, but what I *do* blame Mr. Barlow for is this, that he has allowed so many years to elapse since the fallacy of his estimates has been shown, without once acknowledging his error and attempting to set the world right as to the real cost of manufacturing gas.

The two items in which Mr. Barlow appears to be most in error are the rates and taxes, which he puts at 1.95 shillings per ton of coal, and the wear and tear of meters, which he puts at 1.6 shillings per ton of coal. Mr. Barlow observes oracularly that from his great experience in parochial assessments he feels confident the company will be rated at £13,000 a year, and will have to pay £3,900 a year for rates. Now, in contrast to this, let the reader turn to Mr. Hughes'‖ analysis, Appendix, p. xi., where he will find that the whole sum paid by the Great Central Company, for rents, rates, and taxes, now that the capacity of the works is just equal to about 40,000 tons a year, was only £1,246 a year, or less than a third of the sum which Barlow insisted on estimating.

Hence the following comparison:

	s.	
Barlow's estimate of rates and taxes	1.95	per ton of coal.
Average of the London companies	.89	"
Actual cost to Great Central Company	.65	"
Croll's estimate	.62	"

The parishes in which the Great Central Company has works and mains will do well to look to their assessments.

With respect to meters, Mr. Barlow speaks in equally prophetic and dictatorial terms, when he says the expenses attendant on their *gratuitous* use cannot be less than 15 per cent. of their cost. And again, "The expenses of gas companies, which let meters out to their customers on hire at 10 per cent., considerably exceed the revenue derived from them."

We shall examine this last assertion presently, but let us return to the estimates. Mr. Barlow calculates according to his own data the wear and tear of metres at 1.6 shillings or 1s. 7d. per ton of coal, whereas the real cost to the Great Central Company appears from their own accounts to be 27s. or just over 3d. per ton of coal. We have heard of wide estimating, and contractors and engineers are often taunted with the disparity and want of uniformity in their estimates, but here we have rather an unusual case—a great gas authority estimating a particular definite item at *six* times its real cost.

Mr. Barlow seems to have laid some stress on the gratultous supply of meters, as if this were more expensive to a company than a supply for which consumers are charged. The exact opposite, however, is the fact, because it is perfectly well known, or at all events it ought to be, that when gas companies charge a rental for meters they insist on supplying a much larger size of meter than is at all necessary, and hence a much larger expenditure is required for meters in the first instance, and a much heavier stock must be provided for in the way of repairs and restoration. This fact, which can be abundantly proved, of the absurdly big meters which nearly all rent-charging gas companies insist on supplying to their customers is a significant commentary on the observation which is constantly falling from Mr. Barlow and his school, as to the loss which the gas companies sustain by supplying meters at 10 per cent. of their cost. If this is such an unfortunate thing for the companies, why do they supply their consumers with such preposterously large meters, which must inevitably cause them great expense for repairs? Can Mr. Barlow or anybody else suggest any other reason except that the meter rents pay

them very handsomely—in fact, far too handsomely for the proper working of the system?

An inspection of Hughes' analysis of the London Gas Companies' accounts (pp. 26 and 27), will show that those companies which supply meters gratuitously incur a far less comparative cost for repair of meters than those companies which hire theirs out. This is to be expected, because the companies who have to find meters gratuitously take care for their own sakes not to have them too large, and they have no interest in burdening their customers with large and expensive meters. Hence, as we have already shown, the cost of the Great Central Company for repairing and restoring meters is about 3d. per ton of coal while the highest cost to any London company, namely, the South Metropolitan, is about 1s. per ton of coal, and this at a time when great changes were taking place consequent on the Sale of Gas Acts. At the same time, Mr. Barlow estimates the cost to the Great Central Gas Company at 1s. 7d. per ton of coal.

ON THE WORKING EXPENSES OF THE GAS COMPANIES SUPPLYING THE METROPOLIS.

These expenses have doubtless been very irregular in former years, and have been so mixed up with extensions that considerable difficulty has been experienced in arriving at their real amount. Since the official publication of the accounts, however, which have been prepared according to the form prescribed by the Secretary of State, and the minute analysis of their accounts by Mr. Hughes, a great deal of the difficulty and uncertainty has been removed, and it is possible to arrive at something like a proper idea of the sums expended under the various heads which compose the current outlay of a gas company.

The particulars of expenditure required by the Secretary of State are classified in the following manner:

1st. *Management*, comprising—1. Directors' allowance. 2. Salary of secretary and clerks. 3. Collectors' commission and pay. 4. Rents, rates, and taxes of offices. 5. Stationery, printing, and general charges. 6. Payment to auditors. In comparing the accounts of the London gas companies it has been found necessary to comprise all the rates and taxes under one head, whether paid in respect of the offices or the manufactory, as the companies in some cases do not distinguish between the two. It has also been found convenient to include the payment to auditors along with the payment to directors. With these trifling alterations the following is a summary of the expenses incurred by the London gas companies under the head of management:

TABLE SHOWING EXPENSES OF MANAGEMENT PER TON OF COAL.

	Highest	Lowest.	Ave. of all the Co's calculated from the aggregate tonnage of Coal.
	s.	s.	s.
1. Directors' allowances and payment to Auditors	.84	.22	.40
2. Salary of Secretary and Clerks	1.80	.44	.78
3. Collector's commision and pay	.60	.22	.48
4. Rents, rates, and taxes	1.40	.51	.89
5. Stationey, printing, and general charges	1.29	.24	.44
			2.94

The expenses of manufacture are thus subdivided by the Secretary of State: 1. Coals, including carriage dues, &c. 2. Purifying materials. 3. Supervision and labor. 4. Tools and other implements. 5. Ordinary repair and maintenance of premises. 6. Rent, rates, and taxes of manufactory. 7. Improvements and extension of premises and machinery.

In the comparison I am now making I exclude the coals, because the price of these varies in nearly every town throughout the kingdom, and whilst the information with respect to the other items will be of great use to all persons interested in provincial and other gas-works, the price of coals in London has, of course, no bearing on other works than those in the metropolis. The fourth item—tools and other implements—has been taken with No. 5. The sixth item, namely, rents, rates, and taxes of manufactory, as before explained, has been included under the head of management. The 7th item, relating to extensions and improvements, forms of course no part of current expenditure, and should properly be charged to capital account. Most of the companies return *nil* under this head, and where any amount has been returned it has been struck out as *not belonging* to current expenditure.

TABLE SHOWING ACTUAL MANUFACTURING EXPENSES PER TON OF COAL USED BY THE LONDON COMPANIES.

	Highest	Lowest.	Ave. of all the Co's supplying London.
	s.	s.	s.
1. Purifying materials	.65	.20	.41
2. Supervision and labor	10.86⅝	3.57	4.86
3. Ordinary repair and maintenance of premises	6.08	.65	2.78
			8.05

Under the head of Distribution, the Secretary of State ranges the following items:

1. Ordinary repair and maintenance of mains, service-pipes, &c. 2. Improvement and extension (which must be struck out of current expenditure for the reasons already given.) 3. Restoring and replacing meters. 4. Additional meters (this also is struck out. 5. Law and parliamentary charges.

ON THE WORKING EXPENSES OF PROVINCIAL GAS COMPANIES.

There are many instances both of gas companies and corporations managing their gas-works with a much less expenditure than the London companies. The cheapest working is probably to be found in the manufacturing towns of Lancashire, and as examples of this I append tables showing the cost of the various items during a series of years in the two towns of Bolton and Rochdale. The former is a town of 70,395 inhabitants, with the gas-works in the hands of a company. The latter is a town of 38,184 inhabitants, with the gas-works in the hands of the corporation.

BOLTON GAS WORKS—EXPENSES.

Year.	Tons of Coal used per Annum.	Labor. Cost.	Labor. Per Ton.	Lime. Cost.	Lime. Per Ton.	Rates and Taxes. Cost.	Rates and Taxes. Per Ton.	Stationery. Cost.	Stationery. Per Ton.	Law Charges. Cost.	Law Charges. Per Ton.	Committee. Cost.	Committee. Per Ton.	Miscellaneous Expenses. Cost.	Miscellaneous Expenses. Per Ton.	Wear and Tear. Cost.	Wear and Tear. Per Ton.	Total.
		£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	s. d.
1855	10,755	3,282	6 1	207	0 4½	684	1 3½	75	0 1½	48	0 1	85	0 1⅝	41	0 1	1,620	3 0	11 2
1856	10,600	3,266	6 1¼	180	0 4	668	1 3	84	0 1⅝	50	0 1	92	0 2	84	0 0¾	1,424	2 8	10 10¼
1857	12,167	3,627	5 11⅛	209	0 4	681	1 0¾	127	0 2⅜	1	—	74	0 1½	41	0 0¾	2.590	4 3	12 0
1858	11,379	3,900	6 10⅛	196	0 4	648	1 1½	103	0 2	6	—	64	0 1¼	40	0 0¾	1,857	3 3	11 10¾
1859	13,061	3,676	5 7¾	168	0 3	676	1 0¾	86	0 1⅝	4	—	61	0 1⅛	44	0 0¾	1,049	1 7	8 9¾
1860	14,850	4,420	5 11½	209	0 3¼	783	1 0½	104	0 1½	16	0 0¼	72	0 1¾	78	0 1¼	1,645	2 2½	9 10
	72,812	22.171	6 1½	1,164	0 3¼	4,090	1 1½	579	0 2	120	0 0¼	448	0 1⅛	278	0 1	10,185	2 9¼	10 9

ROCHDALE GAS WORKS—EXPENSES.

Year.	Tons of Coal used per Annum.	Lime. Cost.	Lime. Per Ton.	Labor. Cost.	Labor. Per Ton.	Stationery. Cost.	Repairs. Cost.	Rates and Taxes. Cost.	Total.
		£	s. d.	£	s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.
1846	3,291	123	0 9	1,334	8 1¼	33 0 2¾	176 1 0¾	119 0 8¾	10 10
1847	3,446	105	0 7¾	1,188	6 7¾	30 0 2	436 2 6¼	102 0 7	10 5¾
1848	3,413	80	0 5⅝	764	4 5⅜	22 0 1½	854 5 0	166 0 11½	11 0
1849	3,541	105	0 7	848	4 9¾	25 0 1½	784 4 5	144 0 9¾	10 8¾
1850	3,406	84	0 5¼	957	5 7	28 0 1½	320 1 10¼	96 0 6¾	8 7¼
1851	4,301	86	0 4¾	1,376	6 4¾	28 0 1½	400 1 10¼	141 0 7⅛	9 4½
1852	4,543	99	0 5	1,322	5 9⅜	30 0 1½	500 2 2¼	172 0 9	9 3½
1853	5,095	105	0 4¼	1,239	4 10¼	36 0 1½	800 3 1½	112 0 5⅜	8 11¼
1854	5,966	111	0 4½	1,513	5 0¾	43 0 1¾	900 3 0¾	203 0 8¾	9 3½
1855	6,586	146	0 5¼	1,865	5 8	45 0 1⅜	574 1 8¾	238 0 8½	8 8¾
1856	6,916	129	0 4⅜	1,742	5 0¼	57 0 2	700 2 0¾	242 0 8¼	8 3½
1857	7,667	168	0 5¼	1,721	4 6	67 0 2	350 10¾	381 0 11¾	6 11¾
1858	7,650	152	0 4¾	1,698	4 5¼	78 0 2¾	476 1 2¾	304 0 9¾	7 0¾
1859	8.027	154	0 4⅜	1,931	4 9½	82 0 2¾	570 1 5	267 0 8	2 5¼
	78,848	1.647	0 5¼	19.448	5 3¼	599 0 2	7.840 2 1½	2,687 0 8¼	8 8¼

TABLE SHOWING EXPENSES OF DISTRIBUTION INCURRED BY THE LONDON GAS COMPANIES PER TON OF COAL.

	Highest	Lowest.	Ave. of all the Companies.
	s.	s.	s.
1. Ordinary repair and maintenance of mains, services, &c.	2.68	.09	1.20
2. Restoring and replacing meters.	1.08	.02	.47
3. Law and Parliamentary charges	2.38	nil.	.35
			2.02

The following, then, are the average expenses of all the companies per ton of coal:

	s.
Management	2.94
Manufacture	8.05
Distribution	2.02
	13.01

or say, in round figures, 13s. per ton of coal. There can be little doubt that, owing to the minute accuracy of the accounts required by the Secretary of State, and to the keen supervision which will be devoted to the accounts of a group of companies realizing their full maximum dividends of 10 per cent., the working of future years will show a considerable reduction in the preceding amounts. In the mean time, the present working expenses stand as above, but in comparing these with the working of gas establishments in various parts of the country one or two deductions are necessary.

In the first place, the above expenditure includes the charges of lighting, repairing, extinguishing, and cleaning the public lamps, all of which are services that gas companies should have nothing to do with, and which, in many cases, it would be much to their interest to relinquish. These expenses amount, on the lowest computation, to 1s. per ton of coal.

Many companies, again, do not supply meters to their customers, and when they do supply them a meter rent is commonly received, which considerably exceeds the expenses of the meters. From this consideration it is better to consider the working expenses exclusive of meter repair and restoration. Deducting then .35s. for the average expense of meters, together with 1s. for the public lamps, we have the working expenses of the London companies reduced to 11.66s. or 11s. 8d. per ton of coal carbonized.

BOLTON GAS-WORKS AND ROCHDALE GAS-WORKS.

Both of these examples show a working expenditure considerably below that of the London companies. As the Bolton works belong to the corporation, the accounts contain no charges for directors, this part of the management being gratuitous. At Bolton, however, the only payment to directors appears under the heading of "committee," and only amounts to 1¼d per ton of coal. Adding this to the expenses at Rochdale we have the total expenses there equal to 8s. 10¼d. per ton of coal, and the total expenses at Bolton to 10s. 9d. per ton.

I believe no charges for meters are included in either of these accounts, but in both cases the expenses of public lighting are included, these amounting, as before shown, to at least 1s. a ton. With respect to other places in Lancashire, I find the expenses at Stockport from 1848 to 1851, without public lamps and meters, varying form 10s. 5d. to neary 18s. per ton of coal. From 1855 to 1859, however, the expenses at Stockport, without public lamps and meters, have varied from 7s. 8d. to 13s. 5d. per ton of coal.

The neighboring works of Manchester and Salford, both in the hands of corporations, do not appear to be conducted at less expense than about 13s. per ton of coal, whilst Halifax, in Yorkshire, with gas-works also in the hands of a corporation, appears to work at about 8s. per ton. As an encouragement to the managers and directors of small works, and to show how economically even the smallest gas-works may be conducted, I may quote the case of Woburn, a small town in Bedfordshire, where only about 325 tons of coal are carbonized annually, and where the working expenses in 1856 only amounted to 8s. 4d., and in the next year to 8s. 3d. per ton of coal.

The Plymouth and Stonehouse Gas Company has

been already alluded to as one with a remarkably small capital, and supplying gas at an unusually low price. This company pays 14s. 9d. per ton for Newcastle coal, having expended during last year £10,305 for coal, and received back from the sale of products £4,673. Their whole expenses during the year for the carbonization of 13,973 tons of coal were £9,527, or 13s. 8d. per ton. This included the expenses of meters and public lighting, which together amounted to 1s. 4d. per ton, leaving a net cost of 12s. 4d. The current expenditure, however, evidently includes some amount which should be charged to capital; for instance, £680 for meters, called extension in the accounts, and £2,080 charged for wear and tear in addition to repairs and renewals. Taking off the meters and £1,000 of the latter sum as belonging to capital, we have the whole expenses equal to £7,547, or 10s. 10d. per ton, including meters and public lamps, or 9s. 6d. per ton excluding these.

* "*London and its Gas Companies.*" Waterlow & Sons, 49 Parliament street, Westminster, and 66 London Wall, E. C.

† These items are evidently most excessive. The one for wear and tear probably includes extension of works, and the one for law expenses is exceptionally heavy, owing to the expensive litigation arising out of the Wood street fire.

‡ The figures here do not constitute a perfectly fair comparison, because Messrs. Croll and Barlow probably intended their accounts to include the loss from bad debts, whereas in the accounts of the London Gas Companies, as made out in the form prescribed by the Secretary of State, the loss by bad debts is probably deducted from the gas rental on the other side of the account, and does not appear under the head of collection.

‖ "*London and its Gas Companies,*" by Samuel Hughes, F.G.S.

§ It is scarcely necessary to observe that this item, which occurs in the accounts of the South Metropolitan Company, requires the vigilant attention of the Secretary of State.

THE SEWAGE OF LONDON: ITS UTILIZATION.

We are now in a position to see the present results of the advertisement which appeared some time back, from the Metropolitan Board of Works, asking for tenders for taking the sewage of the metropolis. The Main Drainage Committee reported last week to the Board that nine communications had been received, not one of which fully complied with the terms of the advertisements, whilst three of them made no proposals of the nature of a tender. The report then gave the names of the parties, and a short summary of their proposals.

Even before the appearance of the report, the subject had received considerable "ventilation" in the journals: but the state of the question does not seem to us very different from what it was when last we looked into it. We believe that no member of the Metropolitan Board—whatever may have been said at vestries and other local meetings—entertains the opinion that the sewage ultimately will be worthless. "Entrusted," as Mr. Thwaites has said, "with the execution of important and costly works, but endowed with very inadequate funds for their execution;" in fact, except in the case of the Thames Embankment, compelled to derive their resources "from the direct taxation of the metropolitan rate-payers;" hampered with the debts of predecessors, "and with an arrear of centuries of neglect to overtake, the Board would, we can suppose, hail with delight any means by which their task might be lightened, and the burdens of their fellow-citizens alleviated. But they feel, in the words of the same representative of the Board, that they "are trustees on behalf of the public," whom it is their "duty to protect against vague and visionary schemes; as a hasty adoption of the first wild tentative effort to deal with the sewage, might for years impede the execution of any sound practical plan." They "have kept two objects steadily in view—first, to endeavor to find men of recognized practical and financial ability to perform what they undertake; secondly, to obtain from them a sufficient guarantee that their operations shall not bring" the Board "within the scope of the 31st clause of the Main Drainage Act, whereby the Secretary of State is empowered to call" them "to account, if, in the disposal of" their sewage, they "cause any nuisance." They "believe these conditions can be fulfilled, and with advantage to the rate-payers."

Whether the means are suggested in any of the propositions to the Board, the rate-payers may shortly have opportunity of judging. It seems to be the intention to have the propositions printed *in extenso*. Meanwhile, we append them, much as we find them abridged.

The committee, we may mention, in reporting, first reminded the Board that the subject was one which had already seriously occupied their attention. In April, 1860, in answer to an advertisement, tenders were received, and opened on the 6th of July, 1860, from Messrs. Townsend, Moore & Shepherd, expressed in nearly the same terms as communications by these parties which they have now sent in.

Those who have replied to the recent advertisements are: Dr. Thudichum, Mr. David Curwood, Lord Torrington, Sir Charles Fox, and Mr. Hunt; Mr. John J. Moore, Mr. George Townsend, Secretary to the London Sewage Utilization Company (limited), Mr. George Shepherd, Mr. C. F. Kirkman, Mr. Thomas Ellis, and the Hon. W. Napier and Mr. Hope.

Dr. Thudichum proposes to separate mechanically the house drainage, retaining what he considers most valuable, and gives a sketch of his closet and drains, and tables of analysis of the constituents of fluid sewage. He estimates the net profits at one million per annum.

Mr. Curwood merely suggests the separation of the solid and liquid sewage.

Lord Torrington, Sir C. Fox, and Mr. Thornton Hunt regret, on the grounds of the impolicy of publicly declaring the land with which they propose to deal, not to comply with the advertisement, but express their willingness to discuss the matter, and to enter into a provisional arrangement for a bill in Parliament.

Mr. Moore, Mr. Townsend (on behalf of the London Sewage Utilization Company), and Mr. G. Shepherd, refer to their previous communications responding to the Board's advertisement in April, 1860, as embodying the propositions they have to submit.

The proposals of the London Sewage Utilization Company (reported on 17th January, 1860), were that the Board should grant the company as much sewage as they might require at Barking Creek for two years, at a rent of £5. That, should the experiment be successful, the Board should, at the end of those two years, grant a further term of twenty-one years at the same rent, and at the end of such term that the company should pay such rent for such further term as may be agreed, or as determined by the arbitration of the president of the Institute of Civil Engineers, or by the Board of Trade.

Mr. Moore's proposals were, that the Board should grant the sewage for ninety years, the first fourteen at a peppercorn, and at the expiration of that time one-half of the profits, after deducting 10 per cent. interest on the capital invested, or on such reasonable return as the Secretary of State may award, to be paid by the grantees to the Board. In a further communication, 9th July, 1863, Mr. Moore offers to pay one farthing per ton for every ton of sewage raised by the Board to a height of 200 feet; which, at eighty million gallons daily, would, he estimated, amount to £136,000 per annum; and he states (really a vital point) that he has already engagements with the occupiers of nearly 60,000 acres for the use of the sewage.

Mr. Shepherd, adhering to the proposals in his former letters, states that he shall shortly have plans for applying the whole of the sewage; that he will apply to Parliament for the necessary powers, on obtaining a concession, and asks for that of the south side first. Of Mr. Shepherd's letters, only two are of the nature of tenders. The first asks for a concession of the whole of the sewage of London for fifty years, and offers to divide with the Board the net profits received by the company after paying 7½ per cent. on the invested capital; after fifty years, the company only to deduct 5 per cent. interest on their capital; the second refers to the former tender, but requests that the concession should be full and free.

There remain three communications purporting to be tenders in answer to the Board's last advertisement.

Mr. Kirkman's embodies a patent for obtaining manure from sewage by filtration and deposit—the water after such treatment to be discharged into the river. He purposes to erect works, on condition that the Board shall convey to him the necessary land adjoining the reservoir at Barking, deliver the sewage into his works, grant him use of their frontage and wharfs for the term of seven years at a peppercorn, seven years at a rent of one-fifth the net profits, after deducting a dividend of £20 per cent. on the capital expended; and for a further term of seven years at a rent of one-fifth the net profits after deducting £5 per cent. in the capital; and for any further term at such rate as shall be settled by the Secretary of State. Mr. Kirkman would guarantee a minimum rent of £10,000 per annum, and surrender the works on two years' notice, subject to the repayment of the capital invested, and of a premium of £25 per cent. thereon, and to a royalty of £1 per cent. for the use of his patent.

Mr. Ellis proposes to pump from the Board's reservoirs to covered tanks—the sewage to flow by gravitation through pipes laid along the sides of the roads adjoining the area to be irrigated. Mr. Ellis undertakes to provide all necessary deodorizing agents, and to subject himself in all things to the directions of the Board. The profits, deducting expenses and reserve fund, he proposes to divide equally, and he suggests that three of the directors of his company should be nominated by the Board. The concession he requires should be in perpetuity, subject to the Board's power to purchase after fifty years, on certain conditions.

Messrs. Napier and Hope propose to intercept the whole of the ordinary flow of the northern sewage near Abbey Mills, to convey it by a culvert forty-four miles in length to Maplin Sands on the one hand, and Dengie Flats on the other. Both these areas, extending to fifteen or twenty thousand acres, are at present submerged at high water, and their redemption is part of the project. The capital proposed is two millions—the concession of the sewage to be for fifty years, subject to Parliamentary authority being obtained, and to a grant of the land from the Crown. The net profits to be divided equally, after a deduction of 10 per cent. on the outlay. The Board to have the power of resuming the grant of sewage at the end of the fifty years, on certain conditions.

The committee appended to the report the several tenders from time to time made for taking the sewage of the metropolis, together with supplementary documents and explanations of such tenders, and included also other communications addressed to the Board on the question of the sewage.

The report and the voluminous documents connected with the subject are now being printed, and they will be sent to all the vestries.

It will not be seen from this abridgement of the propositions how the problem is solved; or whether, for example, it is supposed that the Essex marshes can absorb the whole present sewage of the northern half of the metropolis, *plus* the increase in the future. Several things have to be taken as granted before such disposal of the sewage can be calculated upon. First of all, the nature of soil must be that which will absorb sewage in large quantities beneficially; and second, land-owners must be ready or competent to appreciate the value. We pass by, for the moment, without questioning, the point said to be now proved, that sewage can be applied beneficially to all kinds of crops. It may, however, be more important to note that persons considered to be acquainted with agriculture, and the value of the land bordering the Thames—differing, we may suppose, both with Mr. Mechi and Mr. F. Bailey Denton—assert that the land there would be spoiled by sewage-irrigation and land-drainage, and that it is better to keep to the present system of irrigating by ditches and sluice-gates. Taking this view to be wrong, it is to be considered in the estimate of the situation, and of the counteracting influences. But there is a third point, that of levels. If certain theories be correct, no city that is in a valley can be assisted in the disposal of its sewage by the method of irrigation in which the sewage is distributed by gravitation, that is, not by some mechanism of pumps and hose; and the outlets for London would be confined to the areas of ground at lower levels than its system of sewers. These areas, by the system which is in course of completion, would be the country east of the metropolis. The value of guano arises from the concentration of the fertilizing ingredients in a given weight of it. Expenses of carriage can be incurred in its case, which could not in that of the liquid. If all the land to which pipes could be extended or radiated to a considerable distance from the reservoirs at Barking and Crossness

point—and from the whole length reaching across the marshes, of the northern outfall sewer, which is so favorable, in its high level, to the distribution—were available, the quantity of such land would not be sufficient for the sewage of London.

The scheme of Mr. Ellis, which has been in some form before the public for three years, has lately been brought into greater notice by his letters in the papers, and by those of the chairman of the Board in reply. Mr. Ellis proposes to pump the sewage into "a summit regulating reservoir, on either side of the Thames, placed on hills of sufficient elevation" to enable him "to command, by gravitation, the area to be dealt with," as stated to Mr. Thwaites, in a letter dated the 7th of this month, wherein he adds: "It is evident that there are no such hills on the low banks of the Thames." In his tender he offers to take the whole of the sewage, sharing the profits with the rate-payers, and to irrigate more than half a million of acres. Mr. Thwaites says that there are "cases in which the cost of a single lift of 22 feet, added to the expenses of distribution, would more than equal the value of the sewage." Mr. Ellis endeavors to show that the cost of lifting a ton of sewage the height mentioned could not amount to near the sum which would be obtained per ton for the produce, which return in the case of Italian rye grass, was estimated, before the committee of the House of Commons, as 9d. per ton. The cost of raising, he proves, from *Leans Engine Reporter*, which gives the duty of the principal engines in Cornwall, and their expense in coals, could only be somewhat over ¼d. per ton; whilst as to the other "costs of distribution," he is aware of none, since the sewage would descend from the reservoir, through pipes, by gravitation. The elevations in Mr. Ellis's scheme, however, are not twenty-two feet, it has been observed, but 200 feet.

We felt at the first commencement of the Metropolitan Main Drainage—though we were not prepared to say what else the responsible Board for London could have done—that one result on the completion of the works might be the demonstration of the importance of a different system, that of irrigation radiating on all sides from London. The most that the Board have now provided for, beyond the removal of the evils of tide-locked drainage—itself, however, a work of immense value—is comprised in means of disposing of the sewage by irrigation in one direction, provided the sewage can be thus got rid of on the available land. We are not now prepared to say that much more could have been done at the time when the plans were prepared; and we really have not even now examined what are the precise levels, and the soils and crops, of the ditricts far and near, north, south, and west of the metropolis. Of course, this examination should be made, even at the risk of showing the skilfully-executed work of the Board to be not that which would be carried into effect with later knowledge of the subject. If, however, the actual works be the best for the case of London, they certainly would not be presented by those having the best knowledge of the subject, the engineers of the Board itself, as suggesting "the solution of the difficulty" in which Birmingham is placed. The engineers can say, probably better than others, what would be the cost of pumping, and thence decide whether a radiating distribution, requiring that preliminary of expense, would be profitable, or be the most economic means of getting rid of a nuisance. We would merely observe that one portion of the Edinburgh sewage is raised, previously to its distribution by gravitation; and that we presume this method is still found to be profitable, although necessarily less so than the other, where, in the case of the neighboring meadows, the levels are favorable. We have confidence in the chairman and chief members of the Metropolitan Board, and in the officers by whom they have hitherto been ably served. With them lay the responsibility of the original decision, according to the evidence; and we cannot yet conclude that the course taken should have been different in principle, considering the possible consequences of a mistake, the results of which might have been more serious than any that are likely to accrue from the partial retention of the Thames as outfall, and from the concentration of the sewage into a small number of intercepting sewers.—*London Builder.*

EXPERIMENTS WITH SUPERHEATED STEAM AND COAL-TAR.

At a meeting of the gas managers of the counties of Fife, Kinross, Perth, and Forfar, in Scotland, held July 29th, at Broughton Ferry, Mr. R. Gray, of the Dunfermline Gas-Works, made some remarks on the subject of gas from superheated steam and coal-tar. Mr. Gray subsequently sent the following communication to the *Sanitary Reporter*, from which we reprint it:

My attention having been drawn, in March, 1860, to various paragraphs which appeared in the public press extolling a "New Artificial Gas," of a very rich quality, which could be produced in any quantity, at an excessively low price, and that a generator was in course of erection capable of furnishing, in four hours, the gas necessary to light up a city of 30,000 souls; in fact, it was to completely revolutionize the present system of gas manufacture, and gas companies were to meet with such a corrective agent in this new light as would check the obnoxious monopoly they have so long held.

Being anxious to know the truth of this new discovery, which was to be such a boon to the public, and which had been so graphically puffed over the whole length and breadth of the land, I found that an English patent had been taken out by one M. Isoard, of Paris, and the description of his system, in the specification, is as follows:

"My invention relates to carburetting and burning the vapor of water, in order to render it applicable for heating and lighting purposes. I produce the vapor in any kind of generator, or it may be the steam as it leaves the cylinder of steam-engines. I cause this vapor or steam to be superheated, and to traverse in a carburetting apparatus, in which it is charged with gaseous hydro-carbon, which it carries away. On leaving this apparatus, it is passed under the bars of a furnace, in which it serves as fuel. The vapor of hydro-carburet burns, and the steam arising from water also burns, after having been decomposed into hydrogen and oxygen.

"Instead of conducting it under a fire-grate, it may be conducted into a gas-holder, whence it can be allowed to escape at pleasure, and burned like gas used for lighting purposes.

"I vary the preparation of the hydro-carburets to be used, according to the purpose required. For steam intended to serve as fuel, I use heavy tars of all kinds; and for gas for lighting purposes, I use hydro-carburets. Thus the steam leaving a boiler or generator of any kind, even after it has been used for producing the action of an apparatus, is passed through a worm, heater, or any other suitable apparatus, in which it is superheated to a high temperature, and then caused to enter a carburetting apparatus.

"The Claim is for—

"Carburetting superheated steam, effected by causing the superheated steam to traverse hydro-carburets of any kind; this carburetting furnishing, according to the mode of operating and the carburets employed, gas for lighting or for heating purposes."

You will perceive, gentlemen, from such an indefinite specification as the foregoing, that any person who may be willing to test the merits of this discovery, must of necessity contrive an apparatus for himself, as the patentee has not specified any definite arrangement of apparatus by which the desired end is to be effected.

Being always anxious to adopt any new improvement which will lessen manual labor and produce commercially an article at the cheapest first cost, I thought there might be some advantage gained to gas companies by the adoption of this new discovery; consequently, in the summer of 1860, I constructed an apparatus in which a pipe conveys steam from any ordinary steam-boiler, which steam is superheated by passing it through another pipe, curved. The other part of the apparatus consists of a carburetting vessel, a cooler for the gas before entering the gas-holder, a water-supply pipe, and a gas-holder.

In working out all my experiments with this apparatus, I heated the curved pipe to a bright red heat, and then let on steam from the boiler. The steam traversing the curved hot pipe was thoroughly superheated before entering the carburator. This vessel was cylindrical in shape, and held about ten gallons of liquid, but I only used five gallons for each experiment, the vacant space being left for the generation of the gas. The termination of the pipe which conveys the superheated steam to the tar dips within six inches of the bottom of the carburator, with a circular flange fixed upon it two inches less in diameter than the interior of the body of the vessel; a foot above this flange a collar is fixed to the body of the vessel, fitting tightly round the sides, with an open space in centre to allow the gas to pass upwards to the exit pipe.

The object of this arrangement with the flange and collar is to cause the heated steam to be properly diffused throughout the tar in the carburator. The cooler and water lute for back pressure from the gas-holder is a vessel similar to the ordinary hydraulic main, the principle of which you are all familiar with. The water-supply pipe dips within one inch of the bottom of the cooler, and during the time of the generation of gas in the carburator, with the action of the steam, a constant stream of cold water is supplied. The hot water escapes by the open end of the bent pipe in the cooler. The experimental gas-holder was of the capacity of four feet.

From experiments made with an apparatus of this description, the results were as follows: During an hour's working, with seven pounds pressure of steam and five gallons of tar in the carburator, four cubic feet of gas, or rather four cubic feet of an elastic fluid at a temperature of 120° Fah., was all that could be produced. After the temperature of this fluid cooled down to the temperature of the surrounding atmosphere, viz., 60° Fah., there was only one cubic foot in a gaseous state—three-fourths of the hour's produce being condensed. To ascertain the illuminating power of this solitary foot of gas in the holder, was the next step taken, and in doing so I used a little caution. From the manner in which the gas was generated, it was very doubtful what its constituents were; it might be a very rich gas in illuminating power; it was also possible it might be the reverse, and its constituents be of as explosive a nature as gunpowder. In order to prevent any accident to myself or the gas-holder, I filled a bladder with the product, to which bladder a stop-cock was affixed to the mouth, with a No. 2 union jet into it. After putting a light weight on the bladder, I opened the stop-cock, and allowed the gas to escape at the burner. On application of a light to the burner, I found it would neither ignite nor explode. I put in a No. 5 union jet into the stop-cock on the top of the gas-holder, let on the gas, and applied a light to it, and the result was the same as with the No. 2 burner in bladder. I next removed the burner from the stop-cock on gas-holder, and allowed the gas to rush through an aperture of one-eighth of an inch, with a pressure of an inch upon the gas-holder. On the application of a light to this stream of gas it did ignite, but the flame produced was so poor in luminosty it clearly proved that such a quality of gas would never suit for the purposes of illumination.*

The tar used for the above experiments was pure tar as it came from the condensers and hydraulic main, and it contained all the "oils" which chemists tell us exist in coal-tar.

My next experiment was with five gallons of tar, that had the light volatile matter, such as naphtha and benzole, extracted from it before being put into the carburator.

After an hour's working with the same pressure of steam, and the curved pipe at the same red heat as formerly, the gas-holder did not rise to the twentieth part of a foot; this result showing that the tar, when it is deprived of the light volatile substances the superheated steam has little or no effect upon it; in fact, it is one of the most conclusive and satisfactory proofs that it is only the light volatile constituents of the tar that are converted into a gas, at a high temperature, and, although it assumes the fluid form of coal-gas at a temperature of 120° F., it does not remain a permanent

* We made some experiments, two or three years ago, at the Phœnix Gas-Works, London, with Mr. Jabez Church, who had a patent for making coke from a mixture of *breese* and coal-tar. He thought, in coking this material, the gas arising from it might be turned to account. We put some of the mixture into a retort, and passed the gas which came over into a trial gasometer, holding about ten cubic feet. The gas burnt with a blue flame, similar to that of carbonic oxide, but all at once an explosion took place, and the gasometer was "buckled" up from the pressure of the air on the gasometer against the vacuum.

gas, but is condensed into a liquid at a temperature varying from 40° to 60° F., and we must ever bear in mind, in all our researches, that however successful we may be in converting a liquid or a solid into a gas, if that gas require a greater amount of heat to maintain it, as an elastic fluid, than the temperature of the surrounding atmosphere, it will either become a liquid or a solid whenever it is deprived of the additional heat.

Any gas which is wholly condensed, even at the freezing point, or a little below it, will never be of practical use for the general purposes of illumination in a northern climate at least, owing to the mode in which the gas is distributed throughout our streets, factories, and dwelling-houses.

In short, from the results of all my experiments with superheated steam on coal-tar, I am of opinion that the tar which is produced from the destructive distillation of coal in close vessels, at a high temperature, will never be of any commercial value for converting into a gas for the purposes of illumination, if the means used to effect the same is the application of heat.

There are certain physical laws in nature which govern gases and vapors that neither science nor the inventive genius of man will ever be able to overthrow. These laws exist, and must and will be obeyed until the dissolution of this great globe which we now inhabit.

PLUMBAGO FOR STEAM-JOINTS.—Plumbago has recently been introduced as the basis of a superior cement for steam-joints, and the general metallic connections of the engineer. It is composed of 6 parts of plumbago, 3 of slacked lime, 8 of sulphate of baryta, and 3 of boiled linseed oil. This compound, it is said, secures a perfectly air and steam-tight joint, much superior to that obtained by the use of red lead.

DETECTION OF SULPHUR IN BENZOLE.—Sulphur in Benzole and similar oils, in which it is always present when they boil below 170° F., is detected, according to H. Vohl, by keeping a drachm or two for 10 or 15 minutes in a test-tube in contact with a small and fresh-cut piece of metallic potassium, at a temperature not exceeding the boiling-point. The clean surface of the metal will be covered with a red substance, sulphide of potassium, and there is a slight evolution of gas. An equal bulk of distilled water is now added, which may be done without danger. The metal then dissolves with the sulphide in the water, and when the latter is now stirred with a glass rod dipped in a solution of nitro-prusside of sodium, it assumes the fine purple color, characteristic of sulphur. Vohl has, in this manner, found sulphur in nearly all the oils distilled from bituminous materials.—*Polytechn. Notizblatt.*

PATENTS.

UNITED STATES.

39654.—Gilbert Hubbard, Sandisfield, Mass., for a Measure Faucet:

I claim the chamber, A, communicating with the tubes, B C, and provided with the rotating sliding piston, E, and valve, I, all arranged to operate as and for the purpose herein set forth.

I further claim the wheels, F G, in combination with the rotating sliding piston, E, and valve, I, placed within the chamber, A, the wheel, F, being provided with a single tooth, e, which engages with the wheel, G, and the latter provided with an index, g, which comes in contact with a stop, h, at the side of the chamber, A, all being arranged substantially as and for the purpose specified.

39,668.—Robect C. Nichols, Roxbury, Mass., for a Coal Sifter:

I claim the combination of a sifter or screen, g, and pan, h, when arranged and made to operate together in the manner and for the purpose substantially as described.

I also claim making the journals, d, with the flat surfaces as set forth, for the purpose of keeping the pan in position, and imparting the jarring motion to the sieve, as above specified.

39,674.—Charles Oyston, Little Falls, N. Y., for a Nozzle:

I claim the arrangement of a series of divergers, B, or their equivalents, connected to each other and to the nozzle, A, by suitable mechanism, substantially in the manner and for the purpose specified.

39,688.—George Stump, New York City, for a Condenser:

I claim having the chambers, A B, made separate and independent of each other, and of the tube sheets, C, as and for the purpose herein shown and described.

39,691.—John F. Ward, Phillipsburg, N. Y., for a Pipe-Coupling:

I claim the end of the pipe, A', with its hands, l, and recesses, p p, or their equivalents, and packing, B, when applied to the spherical interior of the socket, a, of an adjacent pipe, A, substantially as and for the purpose herein set forth.

39,725.—J. S. Fancher, of Newark, N. J., for a Gas Burner. Antedated October 11, 1862:

I claim the expanding of the gas as it issues from other gas burners, or from any orifice through which the gas is emitted, before it comes in contact with the atmosphere, so as to be ignited by means of two fans or planes, represented in my drawing by figures 3 and 4; these planes may be of any shape or form.

Also the application of the principle of regulating the flame by means of a screw, represented in the drawings by figure 5, with which the fans or planes are separated or brought together, thus adjusting the light as may be desired.

And also the use of the screw for opening the fans for the purpose of cleaning the burner.

39,728.—A. G. Gray, of London, England, for a Pump. Antedated March 11, 1863:

I claim, first, The combination of the peculiarly constructed driving cam, with the right-angular lever arms, s, arranged and operating a pump, substantially as described.

Second, The use of a weight or its equivalent, either adjustible or not, arranged in regard to and operating with the lever arm, s, as to counteract the tendency of the piston rod to be drawn back by the formation of a vacuum in the pump, substantially as described.

RE-ISSUE.

1,530.—Nathan F. Burnham, of York, Pa., formerly of Laurel, Md., for a Water Wheel. Patented February 22, 1859:

I claim, first, A hub, formed with a concave exterior in any manner, substantially as described, so as to derive a lifting tendency from the entrance of water, and deflect it downward, in the described combination with a bucket formed with face vertical, or nearly so, at the top, to receive the direct force of the water; and inclined at bottom to receive its gravitating force.

Second, The combination of the chutes or scrolls, M M, and wheel, Q R, constructed as herein described, to adapt the wheel to operate with good effect with any proportionate quantity of water.

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PROPOSALS.

PROPOSALS FOR CONSTRUCTING A BRICK TUNNEL UNDER LAKE MICHIGAN, TWO MILES LONG, FOR THE CITY OF CHICAGO.

OFFICE OF THE BOARD OF PUBLIC WORKS,
CHICAGO, August 13th, 1863.

Sealed proposals will be received at this office till Wednesday, September 9th, at 11 o'clock, A. M., at which time the Board will open the same, for doing all the work and furnishing all the materials required for the construction of a brick tunnel, five feet clear diameter, and extending from the present pumping works of the city, two miles out, under the bed of Lake Michigan, and through what numerous borings invariably show to be a stiff blue clay soil, together with land and lake shafts, and protecting cribs, in accordance with the plans and specifications for the doing of said work, to be found on file in the office of this Board on and after the 19th inst.

The Board would prefer to let the entire work to one contractor or company, but will receive separate proposals for the tunnel proper and land shaft, for the protecting cribs, and for the cast iron cylinders for lake shafts.

The Board reserves the right to reject any or all bids, and to accept any one bid complying with the conditions of this advertisement.

The bids must be sealed, and must be accompanied with a bond of the penal amount of $200, blanks for which will accompany the specifications, guaranteeing the execution of a contract in accordance with the bid, in case the bid is accepted.

Proposals must be directed to the Board of Public Works, and indorsed "Proposals for Lake Tunnel."

Satisfactory security for the faithful performance of the work will be required of the parties whose bids may be accepted.

J. G. GINDELE,
FRED. LETZ,
F. C. SHERMAN,
Board of Public Works.

OFFICIAL.

THE COMMITTEE ON LAMPS and Gas of the Board of Councilmen, will meet EVERY WEDNESDAY at 1 o'clock P. M., until further notice, in room No. 15, City Hall, for the purpose of investigating all papers referred to them. All persons interested are respectfully requested to appear before the Committee without further notice.

ALEX. BRANDON,
JAMES MURRAY,
RICHARD O'BRIEN. } Committee of Lamps and Gas.

THE COMMITTEE ON SEWERS of the Board of Aldermen will meet EVERY WEDNESDAY, at 2 o'clock P. M., in room No. 8, City Hall. Parties interested in any matter before the Committee will have an apportunity of being heard.

GEO. A. JEREMIAH,
TERENCE FARLEY,
CHARLES H. HALL,
Committee on Sewers.

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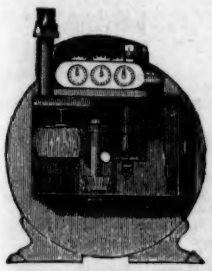

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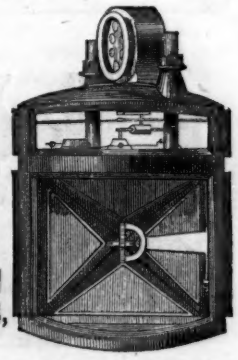

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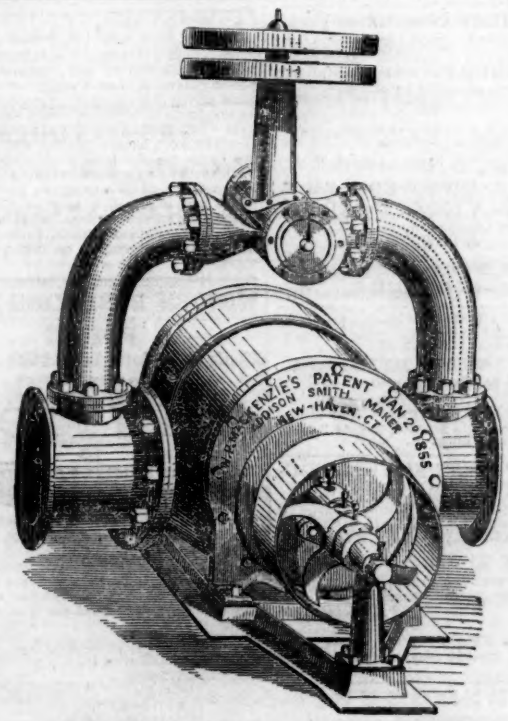

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